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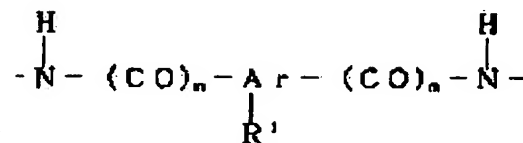
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(54) TONER FOR FLASH FIXING AND ELECTROPHOTOGRAPHIC DEVICE

(57)Abstract:

PURPOSE: To provide a toner, which has an excellent flash fixing characteristic and high storage stability and hardly melts and adheres in a developing device, and to prevent a change of a toner characteristic due to an operating environment by controlling a melting point and a glass transition point of a binder resin used for the toner.

CONSTITUTION: Amorphous polyamide is used for an essential constituent of a binder, and the polyamide includes a unit shown by a formula of 20 mole % in the principal chain. In the formula, Ar represents a divalent aromatic hydrocarbon radical or an aliphatic unsaturated hydrocarbon radical, while R¹ represents a hydrogen atom, a halogen atom, an alkyl group, or an amino group, and (m) shows 0 or 1. To Ar, a carbonyl group and an amino group are bound in the cis position, the ortho position, or the meta position. In other words, even a resin with a comparably low melting point shows a glass transition temperature considerably higher than a room temperature because amorphous polyamide is used, so that a toner with high heat stability can be obtained.



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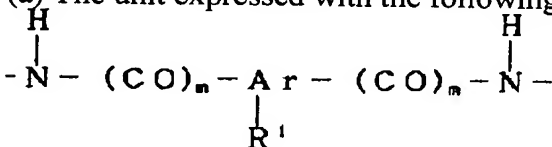
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CLAIMS

[Claim(s)]

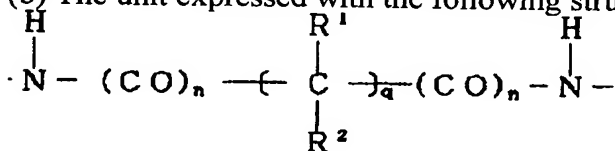
[Claim 1] as the indispensable component of a binder -- an amorphous polyamide -- using -- and this polyamide -- the following -- at least one sort of units chosen from (a) and (b) -- the inside of a principal chain -- at least 20-mol % -- the toner for flash plate fixing characterized by containing.

(a) The unit expressed with the following structure expression : [Formula 1]



(As for Ar, a 20 or less carbon atomic number divalent aromatic hydrocarbon radical or an aliphatic series partial saturation hydrocarbon group, and R¹ are the alkyl groups or amino groups of a hydrogen atom, a halogen atom, and the carbon atomic numbers 1-3 among a formula, and m is 0 or 1, and the carbonyl group or amino group of both sides is combined with cis- grade, the ortho position, or the meta position to Ar.)

(b) The unit expressed with the following structure expression : [Formula 2]



(n is 0 or 1, R¹ is as the above-mentioned definition among a formula, R² is the alkyl group of the carbon atomic numbers 1-4, and R¹ and R² are [q is 1, 2, or 3, and] different radicals in the same unit.)

[Claim 2] Said unit (a) or (b) A FUTARU acid, isophthalic acid, a phthalic anhydride, A maleic acid, a maleic anhydride, 1, 2-JI (methylamino) benzene, 1, 3-JI (methylamino) benzene, a methyl succinic acid, beta-methyl adipic acid, 1, 2-diaminopropane, 1, 2-diamino butane, 1, 3-diamino butane, the 2-methyl -2, the toner for flash plate fixing according to claim 1 constituted from one or more kinds of monomers chosen from the group of 4-diamino pentane.

[Claim 3] The toner for flash plate fixing characterized by being the polymer which shows the rubber elasticity which carried out block copolymerization of the polymer in which the 1st polymer is amorphous polymer and the 2nd polymer contains polybutadiene per one polymer of an epoxy resin, a styrene acrylic, polyester, vinyl resin, and polyamide resin, polybutadiene, or configuration including the 1st polymer and 2nd polymer as an indispensable component of a binder.

Claim 4] The toner for flash plate fixing with which surface tension is characterized by being below 15 dyne/cm WIRUHERUMI law) in 200 degrees C including a surface tension reduction agent as an indispensable component of a binder, including amorphous polymer.

Claim 5] a silicone polymer or a fluoro alkyl polymer -- a binder total amount -- receiving -- 0.1 - 2wt% -- the added toner for flash plate fixing according to claim 3 or 4.

Claim 6] The toner for flash plate fixing according to claim 3, 4, or 5 said whose 1st polymer is a polymer according to claim 1 or 2.

Claim 7] one or more sorts of monomers as which said 1st polymer was chosen from the group of FUTARU acid, isophthalic acid, phthalic-anhydride, maleic-acid, maleic-anhydride; methyl succinic-acid and 1, 2-propylene glycol, 1, 3-butylene-glycol, 1, and 3-butylene glycol -- a constituent -- carrying out -- more than total amount 20 mol % -- the toner for flash plate fixing of claim 3-6 which is included polyester resin given in any 1 term.

- [Claim 8] The toner for flash plate fixing of claim 1-7 given in any 1 term which the flow tester softening temperature whose melting point is 90-150 degrees C, and a glass transition point show at least 55 degrees C or more.
- [Claim 9] The toner for flash plate fixing of claims 1-8 2000-5000, and whose weight average molecular weight (Mw) the number average molecular weight (Mn) of said polyester is 10,000 or more given in any 1 term.
- [Claim 10] more than 50wt% of a binder resin total amount that uses said polyester for a toner -- the toner for flash plate fixing of claim 1-9 given in any 1 term to be used.
- [Claim 11] Saturation magnetization more than 1×10^{-12} S/cm including carbon and a ferromagnetic Toner for flash plate fixing characterized by being more than 1 emu/g (10kOs). [conductivity]
- [Claim 12] Thermal conductivity is 1 J/mKs. Toner for flash plate fixing according to claim 11 which it is above.
- [Claim 13] The toner for flash plate [number average molecular weight / (Mn) / molecular weight / peak / 6000 or less and / (Mp) / softening temperature / 20000 or less and / flow tester] fixing according to claim 11 or 12 using a binder 130 degrees C or less.
- [Claim 14] Electric resistance is 1×10^6 at least. Developer for flash plate fixing characterized by the toner concentration of this developer being less than [20wt%] in the developer which consists of the magnetic carrier and toner more than ω cm, using the toner for flash plate fixing according to claim 9, 10, or 11.
- [Claim 15] Electrophotography equipment characterized by using the toner or developer of claim 1-14 given in any 1 term in the electrophotography equipment using a flash plate anchorage device.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the toner used in order to develop an electrostatic latent image in a xerography etc. It is related with amelioration of the toner for flash plate fixing which gives the high fixing image of especially fixing reinforcement in a flash plate fixing method in more detail.

[0002]

[Description of the Prior Art] Conventionally, the method indicated by U.S. Pat. No. 2297691 etc. as a xerography is common knowledge. Generally this uses photoconductivity insulators (photograph KONDORAMU etc.). Uniform electrostatic charge is given on this photoconductivity insulator by corona discharge etc., and an electrostatic latent image is formed by irradiating a light figure on this photoconductivity insulator with various means. Subsequently After carrying out development visualization of this latent image using the impalpable powder called a toner and imprinting a toner image on paper etc. if needed, a toner image is fixed on record media, such as paper, with means, such as an exposure of pressurization, heating, a solvent steam, light, etc., and a duplication is obtained.

[0003] The particle which pulverized what distributed coloring agents, such as a carbon block, as a toner for developing these electrostatic latent images in the binder resin which consists of nature or synthetic macromolecule matter conventionally to about 1-30 micrometers is used. It is mixed with support matter (carrier), such as a toner simple substance or iron powder, and a glass bead, and this toner is usually used for the development of an electrostatic latent image. Frictional electrification is carried out, and by carrying out mixed churning of the developer which consists of a toner and a carrier when using iron powder or other ferromagnetic particles as a carrier within a developer, when the magnet roll in a developer rotates further, a magnetic brush is formed, and a magnetic brush is carried by the latent-image part on a photoconductivity insulator, and when this magnet roll rotates, when only the electrified toner adheres to a latent image with an electric suction force, development is performed. After development, a toner is newly added, mixed churning is carried out within a development counter, fixed toner concentration is maintained to the developer to which toner concentration fell, and repeat use is carried out at it.

[0004] The toner dust figure formed on the photoconductor drum on the other hand is copied by record media (for example, paper etc.) by the corona transfer, roller transfer, etc. If the toner dust figure imprinted by the record medium adheres to paper in the state of powder, and the image is formed, for example, it rubs with a finger, this image is in the condition of collapsing. In order to fix the toner dust figure on a record medium, it is required to fuse this toner dust figure and to make a record medium fix, and there are the aforementioned various approaches as the approach. In these approaches, flash plate fixing which is the typical approach of optical fixing is an approach established according to the flash of the discharge tubes, such as a xenon flash tube, and has the following descriptions.

** Since it is non-contact fixing, don't degrade the resolution of the image at the time of development.

** There is no latency time behind powering on, and the quick start is possible.

** Even if it gets a record medium blocked in a fixing assembly by the system down, don't ignite.

** Paper with a paste, a preprinted sheet, the paper in which thickness differs can be established regardless of the quality of the material and thickness of a record medium.

[0005] The process which a toner fixes to a record medium by flash plate fixing is as follows. When a toner image is imprinted to a record medium as mentioned above, it adheres to the recording paper with powder, and the image is formed. if the flash of the discharge tubes, such as a xenon flash tube, is irradiated there -- a toner -- flash energy (light) -- absorbing -- temperature -- going up -- softening fusion -- carrying out -- adhesion of a record medium -- it permeates. After a flash finishes, temperature falls and solidifies, serves as a fixing image, fixing is completed, and even if it rubs with a finger etc. the fixing image which fixed to the record medium, it ceases to collapse.

[0006] In flash plate fixing, it is important for a toner to fuse and to stick to a record medium firmly, therefore a toner must absorb from a flash light energy also including the part of the heat energy which diffuses in the external world and does not contribute to a temperature rise, and must fully fuse it. After the binder resin which constitutes a toner fuses quickly and gets cold and becomes hard in the process of fixing to paper etc., it needs to show fixable [good]. In order to acquire such a toner property, the low polymerization macromolecule (for example, the number average molecular weight M_n is less than 1500 and less than 10,000 weight average molecular weight M_w) of low molecular weight with low melting temperature generally called oligomer is used widely.

[0007] Moreover, although this toner needs to absorb flash plate light efficiently and needs to change light energy into heat energy like the above as one of the important properties of the toner for flash plate fixing, in order to acquire the property in connection with absorption of such optical energy, and light energy / heat energy conversion, the toner which distributed the ingredient with high blackness, for example, carbon black, the color, etc. is used widely.

[0008]

[Problem(s) to be Solved by the Invention] Although the oligomer of low molecular weight is used as a binder of the toner for flash plate fixing like the above, oligomer has the problem of the property of a toner tending to change with change of the operation environment (temperature, humidity) of ** equipment which is been easy to weld within ** developing machine, and is easy to generate welding objects (big and rough toner etc.) where it is easy to cause blocking within ** developing machine with a low for example, glass transition point and the low storage stability of ** toner.

[0009] If the oligomer of low molecular weight is used, in order to make the melting point of a binder low as one of the reasons such many troubles happen, when molecular weight is made small, it is because a glass transition point also becomes low and the many become room temperature extent. For this reason, it is necessary to optimize the melting point and the glass transition point of the binder used for a toner as a means to show good flash plate fixable and to solve the above troubles, and to develop the toner using the binder which is a low-melt point point and is a high glass transition point.

[0010] One of the purposes of this invention by controlling the melting point and the glass transition point of the binder resin used for a toner The outstanding flash plate fixable is shown and the storage stability of a toner is high. It is hard to cause blocking within a developing machine, and hard to weld within a developing machine, and is hard to generate welding objects (big and rough toner etc.), and is in offering the toner for flash plate fixing from which the property of a toner cannot change easily due to change of the operation environment (temperature, humidity) of equipment.

[0011] Moreover, the ingredient with the high blackness added in order to absorb optical energy and to change into heat energy like the above has the large effect which it has on the conductivity of a toner, and electrification nature, and it can use it only by the concentration within the limited limits which embraced the development process. For example, as for the toner which contains a color and carbon in the 2 component development process using a magnetic carrier, these contents of less than [10wt%], i.e., conductivity, are usually 1×10^{-14} - 1×10^{-12} S/cm in general. This is for becoming easy to produce carbon, the content of a color, and the greasing called a "fogging" as the content of carbon becomes large especially, and even if it optimizes the conditions of a development process, it is because a fogging cannot be prevented in the field exceeding the above-mentioned range, i.e., the field of the conductivity more than 1×10^{-12} S/cm.

[0012] As one of the reasons such a trouble happens in the 2 component development process using the toner with which the content of a color and the amount of carbon exceeds for example, 10wt%, when the content of carbon exceeds 10wt(s)% especially, it is a color, the content of carbon, and because the conductivity of a toner becomes remarkably large, and this conductive high toner is because the amount of electrifications becomes low in response to the effect of development bias in the development section. For this reason, it is necessary to develop the toner which a fogging does not generate even if the amount of toner electrifications becomes low under the effect of development bias as a means for light energy absorption efficiency to be a high toner with high light energy / heat energy conversion efficiency, and to solve the above troubles.

[0013] By controlling the melting point and the glass transition point of the binder resin which another purpose of this invention fitness-izes the conductivity of a toner, and magnetic susceptibility, and is used for a toner In the electrophotography equipment which has a 2 component development process and a flash plate fixing process at least The outstanding flash plate fixable is shown and the storage stability of a toner is high. It is offering the toner for flash plate fixing from which it is hard to start blocking within a developing machine, and hard to weld within a developing machine, and is hard to generate welding objects (big and rough toner etc.), and the property of a toner cannot change easily due to change of the operation environment (temperature, humidity) of equipment.

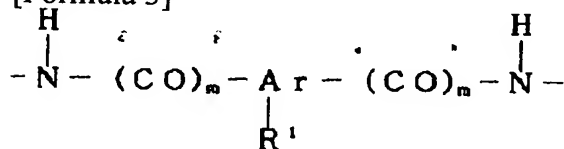
[0014]

[Means for Solving the Problem] in order that this invention may attain the 1st purpose of the above -- as the

indispensable component of a binder -- an amorphism polyamide -- using -- and this polyamide -- the following -- at least one sort of units chosen from (a) and (b) -- the inside of a principal chain -- at least 20-mol % -- the toner for flash plate fixing characterized by containing is offered.

[0015] (a) Unit expressed with the following structure expression : [0016]

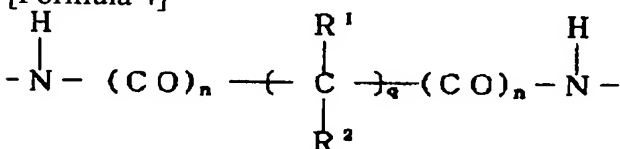
[Formula 3]



[0017] (As for Ar, a 20 or less carbon atomic number divalent aromatic hydrocarbon radical or an aliphatic series partial saturation hydrocarbon group, and R1 are the alkyl groups or amino groups of a hydrogen atom, a halogen atom, and the carbon atomic numbers 1-3 among a formula, and m is 0 or 1, and the carbonyl group or amino group of both sides is combined with cis- grade, the ortho position, or the meta position to Ar.)

(b) Unit expressed with the following structure expression : [0018]

[Formula 4]



[0019] (n is 0 or 1, R1 is as the above-mentioned definition among a formula, R2 is the alkyl group of the carbon atomic numbers 1-4, and R1 and R2 are [q is 1, 2, or 3, and] different radicals in the same unit.)

The unit which includes the structure which the carbonyl group or the amino group of (a) has combined with cis- grade, the ortho position, or the meta position through a double bond or the benzene ring here is the structure forbid rotation of the molecule during association in the repeat unit which forms a macromolecule, and is the structure which is not symmetrical in the straight line which ties two carbon combined with the reaction radical which participates in a polymerization, for example, the amino group, and a carboxyl group. For example, in the repeat unit which forms a macromolecule, when the benzene ring is included as structure of forbidding rotation of the molecule during association, the structure which the amino group or carboxyl group which participates in a polymerization has configured in the ortho position or the meta position at the benzene ring is equivalent to this. Moreover, the unit of (b) is unsymmetrical structure without center of symmetry in the repeat unit which forms a macromolecule. For example, the structure introduced into the structure where the structure which forms a side chain, or an atom forms a principal chain is equivalent to this. The binder without such symmetry structure which has a unit in a molecule repeatedly checks crystallization of a polymer, and serves as a polymer of amorphism.

[0020] By making a polymer into amorphism, when it is made the melting point (90-150 degrees C) of the toner for flash plate fixing, it can usually be made a glass transition point (55 degrees C or more) quite higher than a room temperature. For this reason, in fixing which used the xenon flash tube, melting of the toner using an amorphism polyamide can be carried out with fixing energy far fewer than the toner (for example, toner for hot calender roll fixing) marketed.

[0021] Since a glass transition point becomes room temperature extent and thermal stability is missing when a toner is made into such a low-melt point point using a crystalline polymer, the trouble of the property of a toner tending to change with change of the operation environment (temperature, humidity) of ** equipment which is been easy to weld within ** developing machine, and is easy to generate welding objects (big and rough toner etc.) which is easy to cause blocking within ** developing machine with the low storage stability of ** toner arises. However, since the glass transition temperature of temperature also with the resin of the comparatively low melting point quite more expensive than a room temperature is shown when the amorphism polyamide of this invention is used, the high toner of thermal stability can be obtained.

[0022] The amorphism polyamide of a low-melt point point which can be used for such flash plate fixing is obtained, when number average molecular weight Mn is made to 2000-5000 and it makes weight average molecular weight Mw 10,000 or more in general. It can attain by using a specific monomer for the monomer of a polyamide as an approach of introducing unsymmetrical structure into the polyamide principal chain structure of this invention. This specific monomer is a monomer which gives at least one kind of structure chosen from the group of the above (a) and (b). As long as at least one is the monomer which gives the above-mentioned unsymmetrical unit of the monomer of a

polyamide, the monomer beyond other one or they may use anything. Since according to experience stiffness when the direction which used the monomer which can introduce an aromatic series ring into principal chain structure considers as a toner increases and the reinforcement of a toner becomes high, it is hard coming to generate problems, such as toner grinding within a developing machine.

[0023] The monomer which gives a unit (a) carries out an example, and **** has FUTARU acid [for example,], isophthalic acid, phthalic-anhydride, maleic-acid, maleic-anhydride, 1, 2-JI (methylamino) benzene, 1, and 3-JI (methylamino) benzene etc. Moreover, as an example of the monomer which gives a unit (b), there are a methyl succinic acid, beta-methyl adipic acid, 1, 2-diaminopropane, 1, 2-diamino butane, 1, 3-diamino butane, the 2-methyl -2, a 4-diamino pentane, etc., for example.

[0024] at least one of the monomers which give specific structure into the principal chain structure of a polymer as mentioned above -- at least -- more than 20 mol % -- to contain is required, and when this monomer is less than [20 mol %], since a crystalline polymer is obtained, it becomes high-melting or the polymer of a low glass transition point. However, when using together and using two or more kinds of the above-mentioned monomers, there is no need that each monomer this used together is more than 20 mol %, and the total amount of the monomer this used together should just be more than 20 mol %.

[0025] The monomer (diamine, dicarboxylic acid) used for the usual polyamide can be used for other comonomers which can be used for the amorphism low-melt point point polyamide used for this invention. As an example of a diamine component, there is ethylenediamine, tetramethylenediamine, pentamethylene diamine, hexamethylenediamine, octamethylene diamine, 1, and 4-dimethylamino benzene etc., for example.

[0026] Moreover, as an example of a dicarboxylic acid component, acid anhydrides of this, such as terephthalic acid, a succinic acid, an adipic acid, sebacic acid, a malonic acid, the Reno Laing acid, a mesa KONIN acid, a citraconic acid, an itaconic acid, and glutaconic acid, can be used. Although the above-mentioned amorphism low-melt point point polyamide can be independently used as a toner binder, it can use, even if it uses together with other binders if needed. When using together with other binders and using, the binder to blend can be blended with what is used for toners from the former, for example, can use epoxy, styrene, and styrene-acrylic resin, polyester **, etc. However, when using together with other binders, the content of an amorphism low-melt point point polyamide is made into 50% of the weight or more of a binding resin total amount. It is because the flash plate fixable which an amorphism low-melt point point polyamide has is lost less than 50% of the weight of a case.

[0027] Moreover, this invention is attained by the toner for flash plate fixing characterized by making surface tension below into 15 dyne/cm (WIRUHERUMI law) at 200 degrees C including a surface tension reduction agent, including the polymer which shows rubber-like elasticity as the 2nd polymer as an indispensable component of a binder, including amorphous polymer in order to attain the 1st purpose of the above.

[0028] The reason nil why a toner is desirable as a toner for flash plate fixing is because it excels in the following points. The toner which is a low-melt point point by using for the configuration monomer of a polymer the polymer which used the above-mentioned specific monomer, and was suitable in the first place for [high] flash plate fixing of a glass transition point can be obtained. That is, it is as aforementioned that it can be made into the high polymer of a glass transition point even if amorphous polymer is a low-melt point point comparatively compared with a crystalline polymer.

[0029]

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[0002]

[Description of the Prior Art] Conventionally, the method indicated by U.S. Pat. No. 2297691 etc. as a xerography is common knowledge. Generally this uses photoconductivity insulators (photograph KONDORAMU etc.). Uniform electrostatic charge is given on this photoconductivity insulator by corona discharge etc., and an electrostatic latent image is formed by irradiating a light figure on this photoconductivity insulator with various means. Subsequently After carrying out development visualization of this latent image using the impalpable powder called a toner and imprinting a toner image on paper etc. if needed, a toner image is fixed on record media, such as paper, with means, such as an exposure of pressurization, heating, a solvent steam, light, etc., and a duplication is obtained.

[0003] The particle which pulverized what distributed coloring agents, such as a carbon block, as a toner for developing these electrostatic latent images in the binder resin which consists of nature or synthetic macromolecule matter conventionally to about 1-30 micrometers is used. It is mixed with support matter (carrier), such as a toner simple substance or iron powder, and a glass bead, and this toner is usually used for the development of an electrostatic latent image. Frictional electrification is carried out, and by carrying out mixed churning of the developer which consists of a toner and a carrier when using iron powder or other ferromagnetic particles as a carrier within a developer, when the magnet roll in a developer rotates further, a magnetic brush is formed, and a magnetic brush is carried by the latent-image part on a photoconductivity insulator, and when this magnet roll rotates, when only the electrified toner adheres to a latent image with an electric suction force, development is performed. After development, a toner is newly added, mixed churning is carried out within a development counter, fixed toner concentration is maintained to the developer to which toner concentration fell, and repeat use is carried out at it.

[0004] The toner dust figure formed on the photoconductor drum on the other hand is copied by record media (for example, paper etc.) by the corona transfer, roller transfer, etc. If the toner dust figure imprinted by the record medium adheres to paper in the state of powder, and the image is formed, for example, it rubs with a finger, this image is in the condition of collapsing. In order to fix the toner dust figure on a record medium, it is required to fuse this toner dust figure and to make a record medium fix, and there are the aforementioned various approaches as the approach. In these approaches, flash plate fixing which is the typical approach of optical fixing is an approach established according to the flash of the discharge tubes, such as a xenon flash tube, and has the following descriptions.

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[0005] The process which a toner fixes to a record medium by flash plate fixing is as follows. When a toner image is imprinted to a record medium as mentioned above, it adheres to the recording paper with powder, and the image is formed. if the flash of the discharge tubes, such as a xenon flash tube, is irradiated there -- a toner -- flash energy (light) -- absorbing -- temperature -- going up -- softening fusion -- carrying out -- adhesion of a record medium -- it permeates. After a flash finishes, temperature falls and solidifies, serves as a fixing image, fixing is completed, and even if it rubs with a finger etc. the fixing image which fixed to the record medium, it ceases to collapse.

[0006] In flash plate fixing, it is important for a toner to fuse and to stick to a record medium firmly, therefore a toner must absorb from a flash light energy also including the part of the heat energy which diffuses in the external world and does not contribute to a temperature rise, and must fully fuse it. After the binder resin which constitutes a toner fuses quickly and gets cold and becomes hard in the process of fixing to paper etc., it needs to show fixable [good]. In order to acquire such a toner property, the low polymerization macromolecule (for example, the number average molecular weight M_n is less than 1500 and less than 10,000 weight average molecular weight M_w) of low molecular weight with low melting temperature generally called oligomer is used widely.

[0007] Moreover, although this toner needs to absorb flash plate light efficiently and needs to change light energy into heat energy like the above as one of the important properties of the toner for flash plate fixing, in order to acquire the property in connection with absorption of such optical energy, and light energy / heat energy conversion, the toner which distributed the ingredient with high blackness, for example, carbon black, the color, etc. is used widely.

[0008]

[Problem(s) to be Solved by the Invention] Although the oligomer of low molecular weight is used as a binder of the toner for flash plate fixing like the above, oligomer has the problem of the property of a toner tending to change with change of the operation environment (temperature, humidity) of ** equipment which is been easy to weld within ** developing machine, and is easy to generate welding objects (big and rough toner etc.) where it is easy to cause blocking within ** developing machine with a low for example, glass transition point and the low storage stability of ** toner.

[0009] If the oligomer of low molecular weight is used, in order to make the melting point of a binder low as one of the reasons such many troubles happen, when molecular weight is made small, it is because a glass transition point also becomes low and the many become room temperature extent. For this reason, it is necessary to optimize the melting point and the glass transition point of the binder used for a toner as a means to show good flash plate fixable and to solve the above troubles, and to develop the toner using the binder which is a low-melt point point and is a high glass transition point.

[0010] One of the purposes of this invention by controlling the melting point and the glass transition point of the binder resin used for a toner The outstanding flash plate fixable is shown and the storage stability of a toner is high. It is hard to cause blocking within a developing machine, and hard to weld within a developing machine, and is hard to generate welding objects (big and rough toner etc.), and is in offering the toner for flash plate fixing from which the property of a toner cannot change easily due to change of the operation environment (temperature, humidity) of equipment.

[0011] Moreover, the ingredient with the high blackness added in order to absorb optical energy and to change into heat energy like the above has the large effect which it has on the conductivity of a toner, and electrification nature, and it can use it only by the concentration within the limited limits which embraced the development process. For example, as for the toner which contains a color and carbon in the 2 component development process using a magnetic carrier, these contents of less than [10wt%], i.e., conductivity, are usually 1×10^{-14} - 1×10^{-12} S/cm in general. This is for becoming easy to produce carbon, the content of a color, and the greasing called a "fogging" as the content of carbon becomes large especially, and even if it optimizes the conditions of a development process, it is because a fogging cannot be prevented in the field exceeding the above-mentioned range, i.e., the field of the conductivity more than 1×10^{-12} S/cm.

[0012] As one of the reasons such a trouble happens in the 2 component development process using the toner with which the content of a color and the amount of carbon exceeds for example, 10wt%, when the content of carbon exceeds 10wt(s)% especially, it is a color, the content of carbon, and because the conductivity of a toner becomes remarkably large, and this conductive high toner is because the amount of electrifications becomes low in response to the effect of development bias in the development section. For this reason, it is necessary to develop the toner which a fogging does not generate even if the amount of toner electrifications becomes low under the effect of development bias as a means for light energy absorption efficiency to be a high toner with high light energy / heat energy conversion efficiency, and to solve the above troubles.

[0013] By controlling the melting point and the glass transition point of the binder resin which another purpose of this invention fitness-izes the conductivity of a toner, and magnetic susceptibility, and is used for a toner In the electrophotography equipment which has a 2 component development process and a flash plate fixing process at least The outstanding flash plate fixable is shown and the storage stability of a toner is high. It is offering the toner for flash plate fixing from which it is hard to start blocking within a developing machine, and hard to weld within a developing machine, and is hard to generate welding objects (big and rough toner etc.), and the property of a toner cannot change easily due to change of the operation environment (temperature, humidity) of equipment.

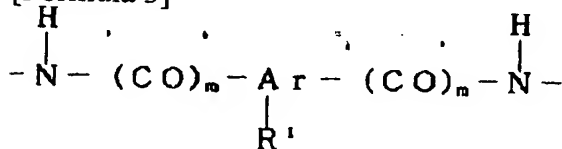
[0014]

Means for Solving the Problem] in order that this invention may attain the 1st purpose of the above -- as the

indispensable component of a binder -- an amorphism polyamide -- using -- and this polyamide -- the following -- at least one sort of units chosen from (a) and (b) -- the inside of a principal chain -- at least 20-mol % -- the toner for flash plate fixing characterized by containing is offered.

[0015] (a) Unit expressed with the following structure expression : [0016]

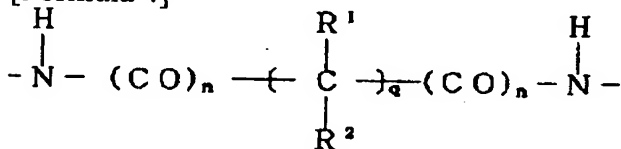
[Formula 3]



[0017] (As for Ar, a 20 or less carbon atomic number divalent aromatic hydrocarbon radical or an aliphatic series partial saturation hydrocarbon group, and R1 are the alkyl groups or amino groups of a hydrogen atom, a halogen atom and the carbon atomic numbers 1-3 among a formula, and m is 0 or 1, and the carbonyl group or amino group of both sides is combined with cis- grade, the ortho position, or the meta position to Ar.)

(b) Unit expressed with the following structure expression : [0018]

[Formula 4]



[0019] (n is 0 or 1, R1 is as the above-mentioned definition among a formula, R2 is the alkyl group of the carbon atomic numbers 1-4, and R1 and R2 are [q is 1, 2, or 3, and] different radicals in the same unit.)

The unit which includes the structure which the carbonyl group or the amino group of (a) has combined with cis- grade, the ortho position, or the meta position through a double bond or the benzene ring here is the structure forbid rotation of the molecule during association in the repeat unit which forms a macromolecule, and is the structure which is not symmetrical in the straight line which ties two carbon combined with the reaction radical which participates in a polymerization, for example, the amino group, and a carboxyl group. For example, in the repeat unit which forms a macromolecule, when the benzene ring is included as structure of forbidding rotation of the molecule during association, the structure which the amino group or carboxyl group which participates in a polymerization has configured in the ortho position or the meta position at the benzene ring is equivalent to this. Moreover, the unit of (b) is unsymmetrical structure without center of symmetry in the repeat unit which forms a macromolecule. For example, the structure introduced into the structure where the structure which forms a side chain, or an atom forms a principal chain is equivalent to this. The binder without such symmetry structure which has a unit in a molecule repeatedly checks crystallization of a polymer, and serves as a polymer of amorphism.

[0020] By making a polymer into amorphism, when it is made the melting point (90-150 degrees C) of the toner for flash plate fixing, it can usually be made a glass transition point (55 degrees C or more) quite higher than a room temperature. For this reason, in fixing which used the xenon flash tube, melting of the toner using an amorphism polyamide can be carried out with fixing energy far fewer than the toner (for example, toner for hot calender roll fixing) marketed.

[0021] Since a glass transition point becomes room temperature extent and thermal stability is missing when a toner is made into such a low-melt point point using a crystalline polymer, the trouble of the property of a toner tending to change with change of the operation environment (temperature, humidity) of ** equipment which is been easy to weld within ** developing machine, and is easy to generate welding objects (big and rough toner etc.) which is easy to cause blocking within ** developing machine with the low storage stability of ** toner arises. However, since the glass transition temperature of temperature also with the resin of the comparatively low melting point quite more expensive than a room temperature is shown when the amorphism polyamide of this invention is used, the high toner of thermal stability can be obtained.

[0022] The amorphism polyamide of a low-melt point point which can be used for such flash plate fixing is obtained, when number average molecular weight Mn is made to 2000-5000 and it makes weight average molecular weight Mw 10,000 or more in general. It can attain by using a specific monomer for the monomer of a polyamide as an approach of introducing unsymmetrical structure into the polyamide principal chain structure of this invention. This specific monomer is a monomer which gives at least one kind of structure chosen from the group of the above (a) and (b). As long as at least one is the monomer which gives the above-mentioned unsymmetrical unit of the monomer of a

polyamide, the monomer beyond other one or they may use anything. Since according to experience stiffness when the direction which used the monomer which can introduce an aromatic series ring into principal chain structure considers as a toner increases and the reinforcement of a toner becomes high, it is hard coming to generate problems, such as toner grinding within a developing machine.

[0023] The monomer which gives a unit (a) carries out an example, and **** has FUTARU acid [for example,], isophthalic acid, phthalic-anhydride, maleic-acid, maleic-anhydride, 1, 2-JI (methylamino) benzene, 1, and 3-JI (methylamino) benzene etc. Moreover, as an example of the monomer which gives a unit (b), there are a methyl succinic acid, beta-methyl adipic acid, 1, 2-diaminopropane, 1, 2-diamino butane, 1, 3-diamino butane, the 2-methyl -2 a 4-diamino pentane, etc., for example.

[0024] at least one of the monomers which give specific structure into the principal chain structure of a polymer as mentioned above -- at least -- more than 20 mol % -- to contain is required, and when this monomer is less than [20 mol %], since a crystalline polymer is obtained, it becomes high-melting or the polymer of a low glass transition point. However, when using together and using two or more kinds of the above-mentioned monomers, there is no need that each monomer this used together is more than 20 mol %, and the total amount of the monomer this used together should just be more than 20 mol %.

[0025] The monomer (diamine, dicarboxylic acid) used for the usual polyamide can be used for other comonomers which can be used for the amorphism low-melt point point polyamide used for this invention. As an example of a diamine component, there is ethylenediamine, tetramethylenediamine, pentamethylene diamine, hexamethylenediamine, octamethylene diamine, 1, and 4-dimethylamino benzene etc., for example.

[0026] Moreover, as an example of a dicarboxylic acid component, acid anhydrides of this, such as terephthalic acid, a succinic acid, an adipic acid, sebacic acid, a malonic acid, the Reno Laing acid, a mesa KONIN acid, a citraconic acid, an itaconic acid, and glutaconic acid, can be used. Although the above-mentioned amorphism low-melt point point polyamide can be independently used as a toner binder, it can use, even if it uses together with other binders if needed. When using together with other binders and using, the binder to blend can be blended with what is used for toners from the former, for example, can use epoxy, styrene, and styrene-acrylic resin, polyester **, etc. However, when using together with other binders, the content of an amorphism low-melt point point polyamide is made into 50% of the weight or more of a binding resin total amount. It is because the flash plate fixable which an amorphism low-melt point point polyamide has is lost less than 50% of the weight of a case.

[0027] Moreover, this invention is attained by the toner for flash plate fixing characterized by making surface tension below into 15 dyne/cm (WIRUHERUMI law) at 200 degrees C including a surface tension reduction agent, including the polymer which shows rubber-like elasticity as the 2nd polymer as an indispensable component of a binder, including amorphous polymer in order to attain the 1st purpose of the above.

[0028] The reason nil why a toner is desirable as a toner for flash plate fixing is because it excels in the following points. The toner which is a low-melt point point by using for the configuration monomer of a polymer the polymer which used the above-mentioned specific monomer, and was suitable in the first place for [high] flash plate fixing of a glass transition point can be obtained. That is, it is as aforementioned that it can be made into the high polymer of a glass transition point even if amorphous polymer is a low-melt point point comparatively compared with a crystalline polymer.

[0029] When a crystalline polymer is made into such a low-melt point point, a glass transition point becomes room temperature extent, and thermal stability is missing. For this reason, the trouble of the property of a toner tending to change with change of the operation environment (temperature, humidity) of ** equipment which is been easy to weld within ** developing machine, and is easy to generate welding objects (big and rough toner etc.) which is easy to cause locking within ** developing machine with the low storage stability of ** toner arises.

[0030] one or more kinds of monomers chosen from the group of FUTARU acid [besides the polyamide which includes the aforementioned specific unit as amorphous polymer], isophthalic acid, phthalic-anhydride, maleic-acid, maleic-anhydride, methyl succinic-acid and 1, 2-propylene glycol, 1, 2-butylene-glycol, 1, and 3-butylene glycol -- a constituent -- carrying out -- more than total amount 20 mol % -- the included polyester can be used.

[0031] the content of the monomer of above specification [which shall become a polymer between amorphism and crystallinity] -- depending -- this monomer -- more than 20 mol % -- when contained, it is effective that a polymer becomes amorphism and uses the polymer beyond 50 mol % preferably. at least one of the monomers which give specific structure into the principal chain structure of polyester as mentioned above -- at least -- more than 20 mol % -- to contain is required, and when this monomer is less than [20 mol %], since a crystalline polymer is obtained, it becomes high-melting or the polymer of a low glass transition point. However, when using together and using two or more kinds of the above-mentioned monomers, there is no need that each monomer this used together is more than 20

mol %, and the total amount of the monomer this used together should just be more than 20 mol %.

[0032] The monomers (dicarboxylic acid, diol, etc.) used for the usual polymer can be used for other comonomers which can be used for the amorphous polymer used for this invention. As an example of a dicarboxylic acid component, acid anhydrides of this, such as terephthalic acid, a succinic acid, an adipic acid, sebacic acid, a malonic acid, the Reno Laing acid, a mesa KONIN acid, a citraconic acid, an itaconic acid, and glutaconic acid, can be used.

[0033] A diol component carries out an example. **** Moreover, ethylene glycol, 1, 3-propylene glycol, A trimethylene glycol, tetramethylene glycol, 1, 4-butylene glycol, Pentamethylene glycol, hexamethylene glycol, hydroquinone, The hydro KINONJI-(beta-hydroxyethyl) ether, 4-4'-dihydroxy biphenyl, Screw-(4-hydroxyphenyl) methane, screw-(4-hydroxyphenyl) diphenylmethane, a screw-(4-hydroxyphenyl) ketone, the screw-(4-hydroxyphenyl) ether, etc. can be used.

[0034] Furthermore, the amorphism polyester which can be used for such flash plate fixing is obtained, when number average molecular weight M_n is made to 3000-5000 and it makes weight average molecular weight M_w 10,000 or more in general. When molecular weight is less than [this], even if the reason for making number average molecular weight 3000 or more, and making weight average molecular weight or more into 10,000 is amorphous polymer, its glass transition point is too low, and it is because thermal stability is missing. The reason for making number average molecular weight or less into 5000 is because flash plate fixable is missing in the case of beyond this.

[0035] Although the above-mentioned amorphism low-melt point point polyester can be independently used as a toner binder, it can use, even if it uses together with other binders if needed. When using together with other binders and using, the binder to blend can be blended with what is used for toners from the former, for example, can use epoxy, styrene, and styrene-acrylic resin, polyamide **, etc. However, when using together with other binders, the content of amorphism polyester is made into 50% of the weight or more of a binding resin total amount. It is because the flash plate fixable which amorphism low-melt point point polyester has is lost less than 50% of the weight of a case.

[0036] It is because the void generated in a flash plate fixing image in the second by using together the polymer which shows a surface tension reduction agent or rubber-like elasticity can be prevented. Since molecular weight (M_n is 5000 or less) is the polymer of low viscosity so greatly, a void generates the above-mentioned binder in a fixing image. In order to prevent this void, it is effective to raise the viscosity (elasticity) of a toner or to stop surface tension low.

[0037] Pori which carried out block copolymerization of the polymer which contains polybutadiene and a polybutadiene copolymer per one polymer of an epoxy resin, a styrene acrylic, polyester, vinyl resin, and polyamide resin, polybutadiene, a polybutadiene copolymer, or configuration as a polymer which shows rubber elasticity can be mentioned. For example, there are epoxy which carried out principal chain denaturation using 1, 4 transformer-polybutadiene, 1, 4 cis--polybutadiene, 1, 2-polybutadiene, Butadiene Styrene, the butadiene-methyl-methacrylate copolymer, the butadiene-methyl-vinyl-ketone copolymer, etc., a styrene-acrylic, polyester, and vinyl system resin.

[0038] Although the molecular weight of the component which shows rubber-like elasticity, and the amount of denaturation to a principal chain are arbitrary, as for 1000-5000, and the amount of denaturation, it is [weight average molecular weight (M_w)] desirable that it is 5 - 30wt% to the weight of a principal chain constituent. If the oligomer which is that the effectiveness that the direction where the component which shows rubber elasticity to a principal chain is introduced to some extent in the shape of a block checks crystallinity after principal chain denaturation is large, and about 1000 to 5000 molecular weight in which the rubber-like component carried out the child set several minutes as a modifier is used, such a block copolymer will depend the reason with more desirable the molecular weight of the rubber component used for denaturation being 1000-5000 on being obtained comparatively easily. Moreover, the reason with more desirable the amount of denaturation being 5 - 30wt% to the weight of a principal chain constituent Effectiveness of the melt viscosity rise at the time of toner melting described that the amount of denaturation is less than [5wt%] by this invention cannot show up easily in many cases. Moreover, in case the degree of hardness of the evil, for example, the copolymer after denaturation, according that it is more than 30wt% to rubber-like component installation falls and this is made into a toner binder, it is for evils, like pulverizing after toner kneading becomes difficult to arise.

[0039] It is a wax-like, the surface-tension reduction agent which can be used by this invention has large effectiveness, liquefied in ordinary temperature, or when the polymer (10,000 or less M_w) of the type which carried out side-chain denaturation of the dimethyl silicone polymer of low molecular weight with polyolefine etc. is used, and effectiveness with the same said of the side-chain denaturation type polymer of the poly fluoro alkyl is acquired. When the ingredient of this is used, the case where the surface tension of a binder is below 15 dyn/cm in general becomes effective for void prevention.

[0040] 1x10 to 12 or more S/cm and saturation magnetization the 2nd purpose of this invention including carbon and a ferromagnetic Thermal conductivity is 1 J/mKs more preferably more than 1 emu/g (10kOe). It is attained by the toner

for flash plate fixing characterized by being above. [conductivity] Here, the carbon black used as an object for toners can usually be used for the carbon of an indispensable constituent.

[0041] Although it is dependent on the conductivity of the carbon black which this toner is made to distribute, the conductivity of the toner which distributed carbon black MA-100, MA-600, #33 which are usually used as an object for toners (above) the case where the Mitsubishi Kasei Corp. make, legal 400R, black PARUZUL (above, Cabot Corp. make), etc. are used -- in general -- more than 10wt% -- 1×10 to 12 or more S/cm of conductivity of a toner can be attained by making it contain.

[0042] The toner with the high content of such carbon black is a toner with the high light energy absorption efficiency of flash plate light in the case of flash plate fixing while being a conductive toner. Furthermore, for carbon black, the heat conductivity is $\lambda = 113$ J/mks. $\lambda = 0.1 - 0.3$ J/mks of a binder Since it compares and has a high value, it can be efficient and the heat energy changed from light energy in the toner front face can be transmitted to the interior of a toner, and a bottom surface part.

[0043] By using a toner with high such optical energy absorption effectiveness and thermal conductivity, melting can be carried out with fixing energy far fewer than the toner marketed in fixing using a xenon flash tube. However, when it applies to a 2 component development process as a toner for flash plate fixing using a conductive toner and a magnetic carrier with many contents of the above carbon black, for example, a ferrite, magnetite, iron powder, etc., the electric resistance of a developer is too low and produces a fogging in a printing background under the effect of development bias. It is most effective to magnetism-ize a toner as an approach of preventing the above-mentioned fogging. The magnetic toner has adhered to the carrier front face with electrostatic attraction to the nonmagnetic toner having adhered to the carrier front face with electrostatic attraction and magnetic attraction in this. For this reason, even if electrification of said magnetic toner falls under the effect of development bias in the case of development, the toner has adhered to the carrier front face with magnetic attraction, it adheres to a printing background, and a fogging is not generated.

[0044] the capacity to prevent a fogging -- rate of MAG sigmas of a magnetic toner -- being decided -- the case of the above-mentioned conductive toner -- saturation magnetization sigmas more than 1 emu/g (10kOs) -- desirable -- It is required to carry out to more than 5 emu/g. In order to magnetism-ize a toner, it can attain by distributing ferromagnetics, such as for example, flight powder, magnetite powder, and iron powder, in this toner. The saturation magnetization of a toner Although it is based also on the saturation magnetization of the magnetic substance which a toner is made to distribute in order to carry out to more than 1 emu/g, it is necessary to carry out to more than 1wt% in general.

[0045] When a magnetism-ized conductivity toner is used as mentioned above, after the binder resin which constitutes a toner fuses quickly and gets cold and becomes hard in the process of fixing to a record medium, it needs to show fixable [good]. In order to attain this purpose, it is desirable to consider as the toner which used the amorphism binder together as an indispensable constituent of the toner binder for flash plate fixing, and, as for this invention, it is desirable that a front amorphism binder uses the binder characterized by what (c) flow tester softening temperature whose (b) weight average molecular weight M_w whose (a) number average molecular weight M_n is 2000 or more and 5000 or less is 10,000 or more and 20,000 or less is 130 degrees C or less.

[0046] Such by using amorphous polymer, when it is made the melting point (90-150 degrees C) of the toner for flash plate fixing, it can usually be made a glass transition point (55 degrees C or more) quite higher than a room temperature. For this reason, in fixing which used the xenon flash tube, melting of the toner using amorphism polyester can be carried out with fixing energy far fewer than the toner (for example, toner for hot calender roll fixing) marketed.

[0047] Although the above-mentioned amorphous polymer can be independently used as a toner binder, it can use, even if it uses together with other binders if needed. When using together with other binders and using, the binder which acts as Brent can be blended with what is used for toners from the former, for example, can use epoxy, styrene, and styrene-acrylic resin, polyamide **, etc. However, when using together with other binders, the content of amorphous polymer is made into 50% of the weight or more of a binding resin total amount. It is because the outstanding flash plate fixable which amorphous polymer has is lost less than 50% of the weight of a case.

[0048] The toner used by this invention can be conventionally manufactured by the well-known approach. namely, the binding resin of an indispensable constituent, a coloring agent (carbon, color), and an inorganic filler -- and if it requires, by the pressurized kneader, the roll mill, an extruder, etc., it can melting-knead, homogeneity distribution can be carried out, an electrification control agent, a conductive control agent, a light absorption agent, a surface tension reduction agent, a viscous regulator, etc. can be impalpable-powder-ized with a grinder, for example, a jet mill etc., it can classify with a classifier, for example, a pneumatic elutriation machine etc., and a desired toner can be obtained.

[0049] Flash plate fixing type electrophotography equipment is typically shown in drawing 1. After carrying out corona discharge to the photoconductor drum 1 which consists of a photosensitive insulator and taking pre-electrification 2 for it, the drum 1 which exposure 3 was taken [drum] and had the electrostatic latent image formed is developed with the developer 5 sent with the developing roller 4 next. Since the toner will carry out frictional electrification of it by the time a carrier and a toner are agitated with the churning screw 6 and a developer 5 is sent to a developing roller 4 by the feed screw 7, a toner is attracted in static electricity by the electrostatic latent image on a photoconductor drum 1, and it is developed to it. Since toner concentration falls, the developer with which the toner was used for development carries out the monitor of the toner concentration by the toner concentration sensor 8, and is supplying the toner from the toner supply drum 9 if needed.

[0050] The image-like toner 10 which was developed on the photoconductor drum 1 and adhered After it impresses the reverse bias electrical potential difference 11 and printing paper 12 imprints, printing paper 12 is sent to the fixing section. If melting of the toner is carried out, it cools and adheres to printing paper by the optical exposure from a xenon lamp 13, in addition the electrophotography printing 14 will be obtained, for example, as a flash plate fixing lamp If it is not restricted to a xenon lamp, and melting of the toner on printing paper 12 is carried out and it is fixed to it, it is usable with any lamps.

[0051] On the other hand, the photoconductor drum 1 which finished the imprint returns to the pre-electrification 2 again through cleaning 15.

[0052]

[Example] In the following examples, many physical properties were measured using the following measuring method. The [melting point] The melting point is temperature when a temperature up flow test is performed using a flow tester (Shimazu flow-tester CFT-500: Shimadzu) and 4mm plunger descends. The conditions of a temperature up flow test are as follows.

[0053]

Die 1mmx1mmphi Temperature up temperature A part for 6-degree-C/ Sample 1.5g Pellet Load 20kgf Preheat temperature 60 degrees C Preheating time 300 seconds [0054] [Glass transition point] The glass transition point was measured using the differential scanning calorimeter (DSC-20: SEIKO electron). It asked from the temperature up endoergic curve for programming-rate/of 5 degrees C.

[0055] [Conductivity] The conductivity of a toner was measured using the dielectric loss measuring device (TR-10C, WBG-9, BDA-9, SE-43, TO-10: Ando Electric). A Measuring condition is as follows.

Applied voltage 200 degrees C Electrode surface product 2.2cm² Frequency 1000Hz sample 0.07g (500kg pile/cm² what carried out tablet shaping in the bottom)

[0056] [Saturation magnetization] The saturation magnetization of a toner was measured using the oscillating sample mold magnetometer (VSM model PHV-55 and Riken Electron). Toner about 0.2g is put into a sample capsule, magnetic field strength is strengthened gradually, and they are 10kOe(s). The magnetic susceptibility in strength was measured and magnetic susceptibility per unit weight was made into saturation magnetization (emu/g).

[0057] [Example 1] Binders 1-5 were made as an experiment using the isophthalic acid which can introduce the structure which a carbonyl group combines with cis- grade, the ortho position, or the meta position through a double bond or the benzene ring as a dicarboxylic acid component, a FUTARU acid, a maleic acid, and the terephthalic acid that introduces the structure combined with the para position through the benzene ring, using ethylenediamine as diamine (Table 1). the structure where a carbonyl group combines binders 2-5 with cis- grade, the ortho position, or the meta position through a double bond or the benzene ring -- more than 20 mol % -- it contains. The obtained binders 2-4 are formless, and are 55-59 degree C of Tg(s), and 121-141 degree C of Tm(s). On the other hand, although a binder 1 is crystallinity and is Tm145 degree C, it is Tg42 degree C.

[0058] The binders 5-6 which similarly introduced the structure which combines the amino group with cis- grade, the ortho position, or the meta position through a double bond or the benzene ring, using 1, 2-JI (methylamino) benzene, 1, 3-JI (methylamino) benzene, 1, and 4-JI (methylamino) benzene as a diamine component, and the binder 7 combined with Para were made as an experiment (Table 2). Although binders 5-6 are formless and it is fitness Tg and Tm, a binder 8 is crystallinity and are un-fitness Tg and Tm.

[0059] It is clear from the above thing that it is possible to reduce Tm remarkably by including the structure which combines a carbonyl group or the amino group with cis- grade, the ortho position, or the meta position through a double bond or the benzene ring.

[0060] [Example 2] The binder 10 was made as an experiment using binders 8-9, the succinic acid which does not introduce an unsymmetrical organic radical, and terephthalic acid using the methyl succinic acid which introduces an unsymmetrical organic radical into principal chain structure as a dicarboxylic acid component, and beta-methyl adipic

acid, using ethylenediamine as diamine (Table 3). Binders 8-9 are amorphous polymer, and are Tg58 degree C and 58-61 degree C of Tm(s). On the other hand, although a binder 10 is crystallinity and is Tg41 degree C, it is Tm183 degree C.

[0061] The binder 15 was made as an experiment using 1 and 3-diaminopropane which does not introduce [similarly] binders 11-14 and an unsymmetrical organic radical using 1 which introduces an unsymmetrical organic radical, 2-diaminopropane, 1, 2-diamino butane, 1, 3-diamino butane, the 2-methyl -2, and 4-diamino pentane into principal chain structure as diamine (Table 4). Binders 11-14 are amorphous polymer, and are 58-65 degree C of Tg(s), and 121-125 degree C of Tm(s). On the other hand, although a binder 15 is crystallinity and is Tg41 degree C, it is Tm183 degree C.

[0062] It is clear from the above thing by introducing an unsymmetrical organic radical into principal chain structure that it is possible to reduce Tm remarkably.

[0063] [Example 3] It is clear from the above-mentioned investigation that there is methyl succinic-acid [for example,], 1, and 3-JI (methylamino) benzene etc., and there is succinic-acid, 1, and 4-JI (methylamino) benzene etc. as a monomer which does not check crystallinity as a monomer which checks the crystallinity of a polymer. The monomer ratio required in order to obtain amorphous polymer was investigated using these monomers (Tables 5 and 6).

[0064] in order to obtain amorphous polymer -- structure (a) or (b) -- the principal chain structure whole -- so much -- more than 20 mol % -- it is clear that it is the case where it contains.

[0065] [Example 4] Using the above-mentioned amorphous polymer, the toners 1-20 of straight polarity were made as an experiment, and flash plate fixable, blocking nature, and electrification stability were investigated. Toner presentations are the binder resin 90 weight section, the Nigrosine color (oil black BY, ORIENT chemistry) 5 weight section, and the carbon black (black PARUZUL, Cabot) 5 weight section. Furthermore, it is considered as the developer using the toner 5 weight section and the indeterminate form iron powder carrier (TSV 100-200, powder tech) which were made as an experiment.

[0066] First, in order to evaluate flash plate fixable, the solid image of 5mm angle was printed using the FACOM-6715D laser beam printer which has adopted the flash plate fixing method, and the tape friction test was performed. At this time, using the capacitor with a capacity of 160 micro F, the setups of a fixing assembly set to charge electrical-potential-difference 2050V, and were impressed to the flash lamp. Moreover, toner thickness of the solid image on a record medium was set to about 15 micrometers. The tape friction test stuck lightly adhesive tape (Scotch whisky noodle DIN KUTEPU, Sumitomo 3M) on the solid image section, rolled the iron cylinder block with a diameter [of 100mm], and a thickness of 20mm in the condition of having made the record medium sticking a tape top with constant speed at a circumferencial direction, and tore off the tape from the record medium after an appropriate time. As a fixable index, the fixable quality was judged from the magnitude of the ratio (percentage) of the optical image concentration before and behind tape exfoliation (ID), and this ratio made good [fixable] 80% or more of thing. Optical image concentration was measured using PCM meter (Macbeth).

[0067] Moreover, toner 20g was put in Pori Bin, and the storage stability and blocking nature of a toner were exposed into 55 degrees C and the 30%RH environment for 12 hours, they removed the toner below 200 meshes (75 micrometers) from the taken-out toner, and evaluated storage stability and blocking nature from the magnitude of the toner weight which remained. The case where the toner weight which remained was less than [10wt%] was made good.

[0068] The stability of the toner property by change of the operation environment (temperature, humidity) of equipment 10g of developers used by fixable evaluation is put in 50 cc Pori Bin. Ordinary temperature, It was exposed for 1 hour into the normal-relative-humidity environment (25 degrees C, 40%RH), and an elevated temperature and a high-humidity environment (35 degrees C, 80%RH), and the amount measurement of electrifications of the developer which carried out ball mill churning (200rpm) for 10 minutes and which was taken out in each environment was carried out further promptly. It evaluated from the magnitude of the ratio (percentage) of the amount of electrifications in ordinary temperature, the elevated temperature over the amount of electrifications in a normal-relative-humidity environment, and a high humidity environment. This ratio made good 70% or more of case.

[0069] An evaluation result is shown in Table 7. It is clear from a result that the toner using a binder with a glass transition temperature of 55 degrees C or more is excellent in blocking nature and electrification stability, and the toner 150 degrees C or less excels [melting point] in flash plate fixable. Furthermore, the toners 5, 11, 12, 16, 19, and 20 using the glass transition temperature of 55 degrees C or more and amorphous polymer with a melting point of 150 degrees C or less are excellent in both thermal stability electrification stability and flash plate fixable.

[0070] [Example 5] The binder blend toners 21-25 were made as an experiment using a binder 8 and polyester (a

bisphenol A diethylene oxide-terephthalate polymer, Mw12000, Tg63 degree C, Tm158 degree C). The addition of a color and carbon was made into the same conditions as an example 4, and was similarly estimated as the example 4. if the rate of polyester without flash plate fixable increases, although flash plate fixable will fall -- the total amount of resin -- receiving -- a binder 8 -- more than 50wt% -- the toner contained is satisfactory to flash plate fixable.

[0071]

[Table 1]

表1 バインダの特性 (1)

名 称	ジオール成分	ジアミン成分	Tg	Tm	結晶性
バインダ 1	テレフタル酸	エチレンジアミン、 ヘキサメチレンジ アミン	42	145	結 晶
バインダ 2	イソフタル酸		58	139	無定形
バインダ 3	フタル酸	ヘキサメチレンジ アミン、 1, 2-ジ (メチ ルアミノ) ベンゼ ン	59	121	無定形
バインダ 4	マレイン酸、 テレフタル酸		55	141	無定形

[0072]

[Table 2]

表2 バインダの特性 (2)

名 称	ジオール成分	ジアミン成分	Tg	Tm	結晶性
バインダ 5	テレフタル酸	エチレンジアミン 1, 2-ジ (メチ ルアミノ) ベンゼ ン	61	126	無定形
バインダ 6	テレフタル酸	1, 3-ジ (メチ ルアミノ) ベンゼ ン	58	127	無定形
バインダ 7	コハク酸	1, 4-ジ (メチ ルアミノ) ベンゼ ン	48	147	結 晶

[0073]

[Table 3]

表3 バインダの特性 (3)

名 称	ジオール成分	ジアミン成分	Tg	Tm	結晶性
バインダ 8	メチルコハク酸	エチレンジアミン 1, 4-ジ (メチ ルアミノ) ベンゼ ン	58	129	無定形
バインダ 9	β -メチルアジ ピン酸		58	125	無定形
バインダ 10	テレフタル酸 コハク酸	エチレンジアミン	41	183	結 晶

[0074]

[Table 4]

表 4 バインダの特性 (4)

名 称	ジオール成分	ジアミン成分	T _g	T _m	結晶性
バインダ11	テレフタル酸	1, 2-ジアミノ プロパン 1, 3-ジアミノ ブタン	65	121	無定形
バインダ12	テレフタル酸	1, 2-ジアミノ ブタン	61	124	無定形
バインダ13	イソフタル酸	1, 3-ジアミノ ブタン	59	123	無定形
バインダ14	テレフタル酸	2-メチル-2, 4-ジアミノペン タン	58	125	無定形
バインダ15	コハク酸	1, 3-ジアミノ プロパン	41	125	結 晶

[0075]

[Table 5]

表 5 バインダの特性 (5)

名 称	ジオール成分	ジアミン成分	比率	T _g	T _m	結晶性
バインダ16	メチルコハク酸 イソフタル酸	1, 4-ジ (メチルアミ ノ) ベンゼン ヘキサメチレ ンジアミン	50	65	115	無定形
バインダ17	メチルコハク酸 コハク酸	エチレンジア ミン 1, 4-ジ (メチルアミ ノ) ベンゼン	40	62	134	無定形
バインダ18	メチルコハク酸 コハク酸	1, 2-ジア ミノプロパン 1, 4-ジ (メチルアミ ノ) ベンゼン	20	56	149	無定形
バインダ7	コハク酸 テレフタル酸	1, 4-ジ (メチルアミ ノ) ベンゼン	0	38	155	結 晶

[0076]

[Table 6]

表6 バインダの特性 (6)

名 称	ジオール成分	ジアミン成分	比率	T _g	T _m	結晶性
バインダ1	テレフタル酸	エチレンジアミン ヘキサメチレンジアミン	0	42	145	結 晶
バインダ19	マレイン酸 テレフタル酸	1, 3 - ジ (メチルアミノ) ベンゼン エチレンジアミン	20	63	129	無定形
バインダ20	マレイン酸 メチルコハク酸 テレフタル酸	1, 4 - ジ (メチルアミノ) ベンゼン	40	65	127	無定形

[0077]

[Table 7]

表7 トナーの特性(1)

名 称	名 称	フ ラ ッ シ ュ 性 定 着 性	ブ ロ ッ キ ン グ 性	帯 電 安 定 性
トナー1	バインダ1	×	×	×
トナー2	バインダ2	△	△	○
トナー3	バインダ3	○	△	○
トナー4	バインダ4	△	△	△
トナー5	バインダ5	○	○	○
トナー6	バインダ6	○	△	○
トナー7	バインダ7	×	×	×
トナー8	バインダ8	○	△	△
トナー9	バインダ9	△	△	○
トナー10	バインダ10	×	×	×
トナー11	バインダ11	○	○	○
トナー12	バインダ12	○	○	○
トナー13	バインダ13	○	△	○
トナー14	バインダ14	○	△	○
トナー15	バインダ15	○	×	×
トナー16	バインダ16	○	○	○
トナー17	バインダ17	△	○	○
トナー18	バインダ18	△	○	○
トナー19	バインダ19	○	○	○
トナー20	バインダ20	○	○	○

[0078]

[Table 8]

表 8 トナーの特性 (2)

名 称	フ ラ ッ シ ュ 定 着 性 ポリイミド/ポリエステル	フ ラ ッ シ ュ 定 着 性	ブ ロ ッ キ ン グ 性	帯 電 安 定 性
トナー 21	100/0	○	△	△
バインダ22	80/20	○	○	○
バインダ23	50/50	○	○	○
バインダ24	30/70	×	○	○
バインダ25	0/100	×	○	○

[0079] [Example 6] Binders 31-41 were made as an experiment, using terephthalic acid, isophthalic acid, a FUTARU acid, a maleic acid, boletic acid, a succinic acid, and a methyl succinic acid as a dicarboxylic acid component, using ethylene glycol, bisphenol A mold diethylene oxide, 1, 2-propylene glycol, 1, 3-propylene glycol, 1, 2-butylene glycol, 1, 3-butylene glycol, and neopentyl glycol as diol (Table 9). The obtained binders 32-34 are formless, and are 56-71 degree C of Tg(s), and 117-123 degree C of Tm(s). On the other hand, although it is Tg63 degree C, it is Tm131 degree C, it is crystallinity, the melting point is high, and although a binder 35 is Tm118 degree C, a binder 31 is Tg53 degree C and a glass transition point is low [a binder / a binder / it is crystallinity, and].

[0080] It is clear from the above result that FUTARU acid, isophthalic acid, maleic-acid, 1, 2-propylene glycol, 1, 2-butylene-glycol, 1, and 3-butylene glycol's it is the monomer which checks the crystallinity of a polymer. Using the above-mentioned polymer, the toners 31-41 of straight polarity were made as an experiment, and flash plate fixable, blocking nature, and electrification stability were investigated. Toner presentations are the binder resin 90 weight section, the Nigrosine color (oil black BY, ORIENT chemistry) 5 weight section, and the carbon black (black PARUZUL, Cabot) 5 weight section. Furthermore, it considered as the developer using the toner 5 weight section and the indeterminate form iron powder carrier (TSV 100-200, powder tech) which were made as an experiment.

[0081] First, in order to evaluate flash plate fixable, the solid image of 5mm angle was printed using FACOM-6715 laser beam printer which has adopted the flash plate fixing method, and the tape friction test was performed. At this time, using the capacitor with a capacity of 160 micro F, the setups of a fixing assembly set to charge electrical-potential-difference 2050V, and were impressed to the flash lamp. Moreover, toner thickness of the solid image on a record medium was set to about 15 micrometers. The tape friction test stuck lightly adhesive tape (a Scotch whisky mending tape, Sumitomo 3M) on the solid image section, rolled the iron cylinder block with a diameter [of 100mm], and a thickness of 20mm in the condition of having made the record medium sticking a tape top with constant speed at a circumferencial direction, and tore off the tape from the record medium after an appropriate time. As a fixable index, the fixable quality was judged from the magnitude of the ratio (percentage) of the optical image concentration before and behind tape exfoliation (ID), and this ratio made good [fixable] 80% or more of thing. Optical image concentration was measured using PCM meter (Macbeth).

[0082] Moreover, the generating situation of POIDO in a fixing image was judged by visual evaluation.

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PRIOR ART

[Description of the Prior Art] Conventionally, the method indicated by U.S. Pat. No. 2297691 etc. as a xerography is common knowledge. Generally this uses photoconductivity insulators (photograph KONDORAMU etc.). Uniform electrostatic charge is given on this photoconductivity insulator by corona discharge etc., and an electrostatic latent image is formed by irradiating a light figure on this photoconductivity insulator with various means. Subsequently After carrying out development visualization of this latent image using the impalpable powder called a toner and imprinting a toner image on paper etc. if needed, a toner image is fixed on record media, such as paper, with means, such as an exposure of pressurization, heating, a solvent steam, light, etc., and a duplication is obtained.

[0003] The particle which pulverized what distributed coloring agents, such as a carbon black, as a toner for developin these electrostatic latent images in the binder resin which consists of nature or synthetic macromolecule matter conventionally to about 1-30 micrometers is used. It is mixed with support matter (carrier), such as a toner simple substance or iron powder, and a glass bead, and this toner is usually used for the development of an electrostatic latent image. Frictional electrification is carried out, and by carrying out mixed churning of the developer which consists of a toner and a carrier when using iron powder or other ferromagnetic particles as a carrier within a developer, when the magnet roll in a developer rotates further, a magnetic brush is formed, and a magnetic brush is carried by the latent-image part on a photoconductivity insulator, and when this magnet roll rotates, when only the electrified toner adheres to a latent image with an electric suction force, development is performed. After development, a toner is newly added, mixed churning is carried out within a development counter, fixed toner concentration is maintained to the developer to which toner concentration fell, and repeat use is carried out at it.

[0004] The toner dust figure formed on the photoconductor drum on the other hand is copied by record media (for example, paper etc.) by the corona transfer, roller transfer, etc. If the toner dust figure imprinted by the record medium adheres to paper in the state of powder, and the image is formed, for example, it rubs with a finger, this image is in the condition of collapsing. In order to fix the toner dust figure on a record medium, it is required to fuse this toner dust figure and to make a record medium fix, and there are the aforementioned various approaches as the approach. In these approaches, flash plate fixing which is the typical approach of optical fixing is an approach established according to the flash of the discharge tubes, such as a xenon flash tube, and has the following descriptions.

** Since it is non-contact fixing, don't degrade the resolution of the image at the time of development.

** There is no latency time behind powering on, and the quick start is possible.

** Even if it gets a record medium blocked in a fixing assembly by the system down, don't ignite.

** Paper with a paste, a preprinted sheet, the paper in which thickness differs can be established regardless of the quality of the material and thickness of a record medium.

[0005] The process which a toner fixes to a record medium by flash plate fixing is as follows. When a toner image is imprinted to a record medium as mentioned above, it adheres to the recording paper with powder, and the image is formed. if the flash of the discharge tubes, such as a xenon flash tube, is irradiated there -- a toner -- flash energy (light -- absorbing -- temperature -- going up -- softening fusion -- carrying out -- adhesion of a record medium -- it permeates. After a flash finishes, temperature falls and solidifies, serves as a fixing image, fixing is completed, and even if it rubs with a finger etc. the fixing image which fixed to the record medium, it ceases to collapse.

[0006] In flash plate fixing, it is important for a toner to fuse and to stick to a record medium firmly, therefore a toner must absorb from a flash light energy also including the part of the heat energy which diffuses in the external world and does not contribute to a temperature rise, and must fully fuse it. After the binder resin which constitutes a toner fuses quickly and gets cold and becomes hard in the process of fixing to paper etc., it needs to show fixable [good]. In order to acquire such a toner property, the low polymerization macromolecule (for example, the number average molecular weight M_n is less than 1500 and less than 10,000 weight average molecular weight M_w) of low molecular weight with

low melting temperature generally called oligomer is used widely.

[0007] Moreover, although this toner needs to absorb flash plate light efficiently and needs to change light energy into heat energy like the above as one of the important properties of the toner for flash plate fixing, in order to acquire the property in connection with absorption of such optical energy, and light energy / heat energy conversion, the toner which distributed the ingredient with high blackness, for example, carbon black, the color, etc. is used widely.

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EFFECT OF THE INVENTION

[Effect of the Invention] By controlling the melting point and the glass transition point of the binder resin used for a toner according to this invention, the outstanding flash plate fixable is shown, and the storage stability of a toner is high, it is hard to cause blocking within a developing machine, and it hard to weld within a developing machine, and it is hard to generate welding objects (big and rough toner etc.), and the toner for flash plate fixing from which the property of a toner cannot change easily due to change of the operation environment (temperature, humidity) of equipment is offered.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Although the oligomer of low molecular weight is used as a binder of the toner for flash plate fixing like the above, oligomer has the problem of the property of a toner tending to change with change of the operation environment (temperature, humidity) of ** equipment which is been easy to weld within ** developing machine, and is easy to generate welding objects (big and rough toner etc.) where it is easy to cause blocking within ** developing machine with a low for example, glass transition point and the low storage stability of ** toner.

[0009] If the oligomer of low molecular weight is used, in order to make the melting point of a binder low as one of the reasons such many troubles happen, when molecular weight is made small, it is because a glass transition point also becomes low and the many become room temperature extent. For this reason, it is necessary to optimize the melting point and the glass transition point of the binder used for a toner as a means to show good flash plate fixable and to solve the above troubles, and to develop the toner using the binder which is a low-melt point point and is a high glass transition point.

[0010] One of the purposes of this invention by controlling the melting point and the glass transition point of the binder resin used for a toner The outstanding flash plate fixable is shown and the storage stability of a toner is high. It is hard to cause blocking within a developing machine, and hard to weld within a developing machine, and is hard to generate welding objects (big and rough toner etc.), and is in offering the toner for flash plate fixing from which the property of a toner cannot change easily due to change of the operation environment (temperature, humidity) of equipment.

[0011] Moreover, the ingredient with the high blackness added in order to absorb optical energy and to change into heat energy like the above has the large effect which it has on the conductivity of a toner, and electrification nature, and it can use it only by the concentration within the limited limits which embraced the development process. For example, as for the toner which contains a color and carbon in the 2 component development process using a magnetic carrier, these contents of less than [10wt%], i.e., conductivity, are usually 1×10^{-14} - 1×10^{-12} S/cm in general. This is for becoming easy to produce carbon, the content of a color, and the greasing called a "fogging" as the content of carbon becomes large especially, and even if it optimizes the conditions of a development process, it is because a fogging cannot be prevented in the field exceeding the above-mentioned range, i.e., the field of the conductivity more than 1×10^{-12} S/cm.

[0012] As one of the reasons such a trouble happens in the 2 component development process using the toner with which the content of a color and the amount of carbon exceeds for example, 10wt%, when the content of carbon exceeds 10wt(s)% especially, it is a color, the content of carbon, and because the conductivity of a toner becomes remarkably large, and this conductive high toner is because the amount of electrifications becomes low in response to the effect of development bias in the development section. For this reason, it is necessary to develop the toner which a fogging does not generate even if the amount of toner electrifications becomes low under the effect of development bias as a means for light energy absorption efficiency to be a high toner with high light energy / heat energy conversion efficiency, and to solve the above troubles.

[0013] By controlling the melting point and the glass transition point of the binder resin which another purpose of this invention fitness-izes the conductivity of a toner, and magnetic susceptibility, and is used for a toner In the electrophotography equipment which has a 2 component development process and a flash plate fixing process at least The outstanding flash plate fixable is shown and the storage stability of a toner is high. It is offering the toner for flash plate fixing from which it is hard to start blocking within a developing machine, and hard to weld within a developing machine, and is hard to generate welding objects (big and rough toner etc.), and the property of a toner cannot change easily due to change of the operation environment (temperature, humidity) of equipment.

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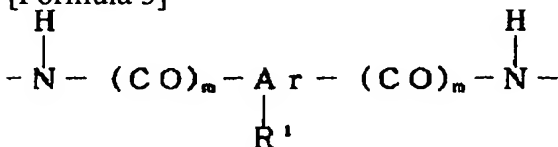
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MEANS

[Means for Solving the Problem] in order that this invention may attain the 1st purpose of the above -- as the indispensable component of a binder -- an amorphism polyamide -- using -- and this polyamide -- the following -- at least one sort of units chosen from (a) and (b) -- the inside of a principal chain -- at least 20-mol % -- the toner for flash plate fixing characterized by containing is offered.

[0015] (a) Unit expressed with the following structure expression : [0016]

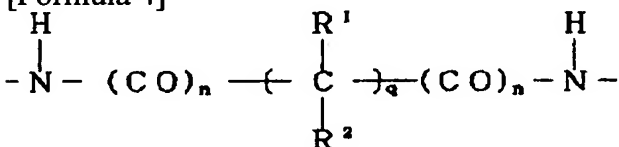
[Formula 3]



[0017] (As for Ar, a 20 or less carbon atomic number divalent aromatic hydrocarbon radical or an aliphatic series partial saturation hydrocarbon group, and R1 are the alkyl groups or amino groups of a hydrogen atom, a halogen atom, and the carbon atomic numbers 1-3 among a formula, and m is 0 or 1, and the carbonyl group or amino group of both sides is combined with cis- grade, the ortho position, or the meta position to Ar.)

(b) Unit expressed with the following structure expression : [0018]

[Formula 4]



[0019] (n is 0 or 1, R1 is as the above-mentioned definition among a formula, R2 is the alkyl group of the carbon atomic numbers 1-4, and R1 and R2 are [q is 1, 2, or 3, and] different radicals in the same unit.)

The unit which includes the structure which the carbonyl group or the amino group of (a) has combined with cis- grade, the ortho position, or the meta position through a double bond or the benzene ring here is the structure forbid rotation of the molecule during association in the repeat unit which forms a macromolecule, and is the structure which is not symmetrical in the straight line which ties two carbon combined with the reaction radical which participates in a polymerization, for example, the amino group, and a carboxyl group. For example, in the repeat unit which forms a macromolecule, when the benzene ring is included as structure of forbidding rotation of the molecule during association, the structure which the amino group or carboxyl group which participates in a polymerization has configured in the ortho position or the meta position at the benzene ring is equivalent to this. Moreover, the unit of (b) is unsymmetrical structure without center of symmetry in the repeat unit which forms a macromolecule. For example, the structure introduced into the structure where the structure which forms a side chain, or an atom forms a principal chain is equivalent to this. The binder without such symmetry structure which has a unit in a molecule repeatedly checks crystallization of a polymer, and serves as a polymer of amorphism.

[0020] By making a polymer into amorphism, when it is made the melting point (90-150 degrees C) of the toner for flash plate fixing, it can usually be made a glass transition point (55 degrees C or more) quite higher than a room temperature. For this reason, in fixing which used the xenon flash tube, melting of the toner using an amorphism polyamide can be carried out with fixing energy far fewer than the toner (for example, toner for hot calender roll fixing) marketed.

[0021] Since a glass transition point becomes room temperature extent and thermal stability is missing when a toner is

made into such a low-melt point point using a crystalline polymer, the trouble of the property of a toner tending to change with change of the operation environment (temperature, humidity) of ** equipment which is been easy to weld within ** developing machine, and is easy to generate welding objects (big and rough toner etc.) which is easy to cause blocking within ** developing machine with the low storage stability of ** toner arises. However, since the glass transition temperature of temperature also with the resin of the comparatively low melting point quite more expensive than a room temperature is shown when the amorphism polyamide of this invention is used, the high toner of thermal stability can be obtained.

[0022] The amorphism polyamide of a low-melt point point which can be used for such flash plate fixing is obtained, when number average molecular weight M_n is made to 2000-5000 and it makes weight average molecular weight M_w 10,000 or more in general. It can attain by using a specific monomer for the monomer of a polyamide as an approach of introducing unsymmetrical structure into the polyamide principal chain structure of this invention. This specific monomer is a monomer which gives at least one kind of structure chosen from the group of the above (a) and (b). As long as at least one is the monomer which gives the above-mentioned unsymmetrical unit of the monomer of a polyamide, the monomer beyond other one or they may use anything. Since according to experience stiffness when the direction which used the monomer which can introduce an aromatic series ring into principal chain structure considers as a toner increases and the reinforcement of a toner becomes high, it is hard coming to generate problems, such as toner grinding within a developing machine.

[0023] The monomer which gives a unit (a) carries out an example, and **** has FUTARU acid [for example,], isophthalic acid, phthalic-anhydride, maleic-acid, maleic-anhydride, 1, 2-JI (methylamino) benzene, 1, and 3-JI (methylamino) benzene etc. Moreover, as an example of the monomer which gives a unit (b), there are a methyl succinic acid, beta-methyl adipic acid, 1, 2-diaminopropane, 1, 2-diamino butane, 1, 3-diamino butane, the 2-methyl -2 a 4-diamino pentane, etc., for example.

[0024] at least one of the monomers which give specific structure into the principal chain structure of a polymer as mentioned above -- at least -- more than 20 mol % -- to contain is required, and when this monomer is less than [20 mol %], since a crystalline polymer is obtained, it becomes high-melting or the polymer of a low glass transition point. However, when using together and using two or more kinds of the above-mentioned monomers, there is no need that each monomer this used together is more than 20 mol %, and the total amount of the monomer this used together should just be more than 20 mol %.

[0025] The monomer (diamine, dicarboxylic acid) used for the usual polyamide can be used for other comonomers which can be used for the amorphism low-melt point point polyamide used for this invention. As an example of a diamine component, there is ethylenediamine, tetramethylenediamine, pentamethylene diamine, hexamethylenediamine, octamethylene diamine, 1, and 4-dimethylamino benzene etc., for example.

[0026] Moreover, as an example of a dicarboxylic acid component, acid anhydrides of this, such as terephthalic acid, a succinic acid, an adipic acid, sebacic acid, a malonic acid, the Reno Laing acid, a mesa KONIN acid, a citraconic acid, an itaconic acid, and glutaconic acid, can be used. Although the above-mentioned amorphism low-melt point point polyamide can be independently used as a toner binder, it can use, even if it uses together with other binders if needed. When using together with other binders and using, the binder to blend can be blended with what is used for toners from the former, for example, can use epoxy, styrene, and styrene-acrylic resin, polyester **, etc. However, when using together with other binders, the content of an amorphism low-melt point point polyamide is made into 50% of the weight or more of a binding resin total amount. It is because the flash plate fixable which an amorphism low-melt point point polyamide has is lost less than 50% of the weight of a case.

[0027] Moreover, this invention is attained by the toner for flash plate fixing characterized by making surface tension below into 15 dynes (WIRUHERUMI law)/cm at 200 degrees C including a surface tension reduction agent, including the polymer which shows rubber-like elasticity as the 2nd polymer as an indispensable component of a binder, including amorphous polymer in order to attain the 1st purpose of the above.

[0028] The reason nil why a toner is desirable as a toner for flash plate fixing is because it excels in the following points. The toner which is a low-melt point point by using for the configuration monomer of a polymer the polymer which used the above-mentioned specific monomer, and was suitable in the first place for [high] flash plate fixing of a glass transition point can be obtained. That is, it is as aforementioned that it can be made into the high polymer of a glass transition point even if amorphous polymer is a low-melt point point comparatively compared with a crystalline polymer.

[0029] When a crystalline polymer is made into such a low-melt point point, a glass transition point becomes room temperature extent, and thermal stability is missing. For this reason, the trouble of the property of a toner tending to change with change of the operation environment (temperature, humidity) of ** equipment which is been easy to weld

within ** developing machine, and is easy to generate welding objects (big and rough toner etc.) which is easy to cause blocking within ** developing machine with the low storage stability of ** toner arises.

[0030] one or more kinds of monomers chosen from the group of FUTARU acid [besides the polyamide which includes the aforementioned specific unit as amorphous polymer], isophthalic acid, phthalic-anhydride, maleic-acid, maleic-anhydride, methyl succinic-acid and 1, 2-propylene glycol, 1, 2-butylene-glycol, 1, and 3-butylene glycol -- a constituent -- carrying out -- more than total amount 20 mol % -- the included polyester can be used.

[0031] the content of the monomer of above specification [which shall become a polymer between amorphism and crystallinity] -- depending -- this monomer -- more than 20 mol % -- when contained, it is effective that a polymer becomes amorphism and uses the polymer beyond 50 mol % preferably. at least one of the monomers which give specific structure into the principal chain structure of polyester as mentioned above -- at least -- more than 20 mol % -- to contain is required, and when this monomer is less than [20 mol %], since a crystalline polymer is obtained, it becomes high-melting or the polymer of a low glass transition point. However, when using together and using two or more kinds of the above-mentioned monomers, there is no need that each monomer this used together is more than 20 mol %, and the total amount of the monomer this used together should just be more than 20 mol %.

[0032] The monomers (dicarboxylic acid, diol, etc.) used for the usual polymer can be used for other comonomers which can be used for the amorphous polymer used for this invention. As an example of a dicarboxylic acid component, acid anhydrides of this, such as terephthalic acid, a succinic acid, an adipic acid, sebacic acid, a malonic acid, the Reno Laing acid, a mesa KONIN acid, a citraconic acid, an itaconic acid, and glutaconic acid, can be used.

[0033] A diol component carries out an example. **** Moreover, ethylene glycol, 1, 3-propylene glycol, A trimethylene glycol, tetramethylene glycol, 1, 4-butylene glycol,

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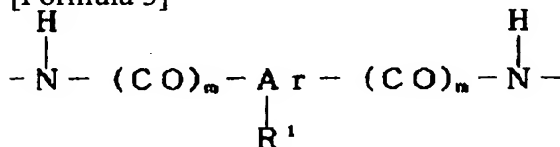
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3. In the drawings, any words are not translated.

MEANS

[Means for Solving the Problem] in order that this invention may attain the 1st purpose of the above -- as the indispensable component of a binder -- an amorphism polyamide -- using -- and this polyamide -- the following -- at least one sort of units chosen from (a) and (b) -- the inside of a principal chain -- at least 20-mol % -- the toner for flash plate fixing characterized by containing is offered.

[0015] (a) Unit expressed with the following structure expression : [0016]

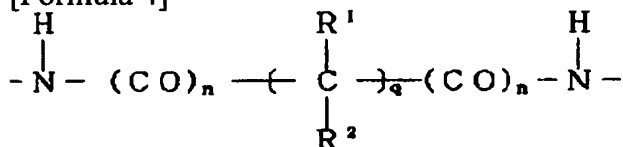
[Formula 3]



[0017] (As for Ar, a 20 or less carbon atomic number divalent aromatic hydrocarbon radical or an aliphatic series partial saturation hydrocarbon group, and R1 are the alkyl groups or amino groups of a hydrogen atom, a halogen atom, and the carbon atomic numbers 1-3 among a formula, and m is 0 or 1, and the carbonyl group or amino group of both sides is combined with cis- grade, the ortho position, or the meta position to Ar.)

(b) Unit expressed with the following structure expression : [0018]

[Formula 4]



[0019] (n is 0 or 1, R1 is as the above-mentioned definition among a formula, R2 is the alkyl group of the carbon atomic numbers 1-4, and R1 and R2 are [q is 1, 2, or 3, and] different radicals in the same unit.)

The unit which includes the structure which the carbonyl group or the amino group of (a) has combined with cis- grade the ortho position, or the meta position through a double bond or the benzene ring here is the structure forbid rotation of the molecule during association in the repeat unit which forms a macromolecule, and is the structure which is not symmetrical in the straight line which ties two carbon combined with the reaction radical which participates in a polymerization, for example, the amino group, and a carboxyl group. For example, in the repeat unit which forms a macromolecule, when the benzene ring is included as structure of forbidding rotation of the molecule during association, the structure which the amino group or carboxyl group which participates in a polymerization has configured in the ortho position or the meta position at the benzene ring is equivalent to this. Moreover, the unit of (b) is unsymmetrical structure without center of symmetry in the repeat unit which forms a macromolecule. For example, the structure introduced into the structure where the structure which forms a side chain, or an atom forms a principal chain is equivalent to this. The binder without such symmetry structure which has a unit in a molecule repeatedly checks crystallization of a polymer, and serves as a polymer of amorphism.

[0020] By making a polymer into amorphism, when it is made the melting point (90-150 degrees C) of the toner for flash plate fixing, it can usually be made a glass transition point (55 degrees C or more) quite higher than a room temperature. For this reason, in fixing which used the xenon flash tube, melting of the toner using an amorphism polyamide can be carried out with fixing energy far fewer than the toner (for example, toner for hot calender roll fixing) marketed.

[0021] Since a glass transition point becomes room temperature extent and thermal stability is missing when a toner is

made into such a low-melt point point using a crystalline polymer, the trouble of the property of a toner tending to change with change of the operation environment (temperature, humidity) of ** equipment which is been easy to weld within ** developing machine, and is easy to generate welding objects (big and rough toner etc.) which is easy to cause blocking within ** developing machine with the low storage stability of ** toner arises. However, since the glass transition temperature of temperature also with the resin of the comparatively low melting point quite more expensive than a room temperature is shown when the amorphism polyamide of this invention is used, the high toner of thermal stability can be obtained.

[0022] The amorphism polyamide of a low-melt point point which can be used for such flash plate fixing is obtained, when number average molecular weight M_n is made to 2000-5000 and it makes weight average molecular weight M_w 10,000 or more in general. It can attain by using a specific monomer for the monomer of a polyamide as an approach of introducing unsymmetrical structure into the polyamide principal chain structure of this invention. This specific monomer is a monomer which gives at least one kind of structure chosen from the group of the above (a) and (b). As long as at least one is the monomer which gives the above-mentioned unsymmetrical unit of the monomer of a polyamide, the monomer beyond other one or they may use anything. Since according to experience stiffness when the direction which used the monomer which can introduce an aromatic series ring into principal chain structure considers as a toner increases and the reinforcement of a toner becomes high, it is hard coming to generate problems, such as toner grinding within a developing machine.

[0023] The monomer which gives a unit (a) carries out an example, and **** has FUTARU acid [for example,], isophthalic acid, phthalic-anhydride, maleic-acid, maleic-anhydride, 1, 2-JI (methylamino) benzene, 1, and 3-JI (methylamino) benzene etc. Moreover, as an example of the monomer which gives a unit (b), there are a methyl succinic acid, beta-methyl adipic acid, 1, 2-diaminopropane, 1, 2-diamino butane, 1, 3-diamino butane, the 2-methyl -2 a 4-diamino pentane, etc., for example.

[0024] at least one of the monomers which give specific structure into the principal chain structure of a polymer as mentioned above -- at least -- more than 20 mol % -- to contain is required, and when this monomer is less than [20 mol %], since a crystalline polymer is obtained, it becomes high-melting or the polymer of a low glass transition point. However, when using together and using two or more kinds of the above-mentioned monomers, there is no need that each monomer this used together is more than 20 mol %, and the total amount of the monomer this used together should just be more than 20 mol %.

[0025] The monomer (diamine, dicarboxylic acid) used for the usual polyamide can be used for other comonomers which can be used for the amorphism low-melt point point polyamide used for this invention. As an example of a diamine component, there is ethylenediamine, tetramethylenediamine, pentamethylene diamine, hexamethylenediamine, octamethylene diamine, 1, and 4-dimethylamino benzene etc., for example.

[0026] Moreover, as an example of a dicarboxylic acid component, acid anhydrides of this, such as terephthalic acid, a succinic acid, an adipic acid, sebacic acid, a malonic acid, the Reno Laing acid, a mesa KONIN acid, a citraconic acid, an itaconic acid, and glutaconic acid, can be used. Although the above-mentioned amorphism low-melt point point polyamide can be independently used as a toner binder, it can use, even if it uses together with other binders if needed. When using together with other binders and using, the binder to blend can be blended with what is used for toners from the former, for example, can use epoxy, styrene, and styrene-acrylic resin, polyester **, etc. However, when using together with other binders, the content of an amorphism low-melt point point polyamide is made into 50% of the weight or more of a binding resin total amount. It is because the flash plate fixable which an amorphism low-melt point point polyamide has is lost less than 50% of the weight of a case.

[0027] Moreover, this invention is attained by the toner for flash plate fixing characterized by making surface tension below into 15 dynes (WIRUHERUMI law)/cm at 200 degrees C including a surface tension reduction agent, including the polymer which shows rubber-like elasticity as the 2nd polymer as an indispensable component of a binder, including amorphous polymer in order to attain the 1st purpose of the above.

[0028] The reason nil why a toner is desirable as a toner for flash plate fixing is because it excels in the following points. The toner which is a low-melt point point by using for the configuration monomer of a polymer the polymer which used the above-mentioned specific monomer, and was suitable in the first place for [high] flash plate fixing of glass transition point can be obtained. That is, it is as aforementioned that it can be made into the high polymer of a glass transition point even if amorphous polymer is a low-melt point point comparatively compared with a crystalline polymer.

[0029] When a crystalline polymer is made into such a low-melt point point, a glass transition point becomes room temperature extent, and thermal stability is missing. For this reason, the trouble of the property of a toner tending to change with change of the operation environment (temperature, humidity) of ** equipment which is been easy to weld

within ** developing machine, and is easy to generate welding objects (big and rough toner etc.) which is easy to cause blocking within ** developing machine with the low storage stability of ** toner arises.

[0030] one or more kinds of monomers chosen from the group of FUTARU acid [besides the polyamide which includes the aforementioned specific unit as amorphous polymer], isophthalic acid, phthalic-anhydride, maleic-acid, maleic-anhydride, methyl succinic-acid and 1, 2-propylene glycol, 1, 2-butylene-glycol, 1, and 3-butylene glycol -- a constituent -- carrying out -- more than total amount 20 mol % -- the included polyester can be used.

[0031] the content of the monomer of above specification [which shall become a polymer between amorphism and crystallinity] -- depending -- this monomer -- more than 20 mol % -- when contained, it is effective that a polymer becomes amorphism and uses the polymer beyond 50 mol % preferably. at least one of the monomers which give specific structure into the principal chain structure of polyester as mentioned above -- at least -- more than 20 mol % -- to contain is required, and when this monomer is less than [20 mol %], since a crystalline polymer is obtained, it becomes high-melting or the polymer of a low glass transition point. However, when using together and using two or more kinds of the above-mentioned monomers, there is no need that each monomer this used together is more than 20 mol %, and the total amount of the monomer this used together should just be more than 20 mol %.

[0032] The monomers (dicarboxylic acid, diol, etc.) used for the usual polymer can be used for other comonomers which can be used for the amorphous polymer used for this invention. As an example of a dicarboxylic acid component, acid anhydrides of this, such as terephthalic acid, a succinic acid, an adipic acid, sebacic acid, a malonic acid, the Reno Laing acid, a mesa KONIN acid, a citraconic acid, an itaconic acid, and glutaconic acid, can be used.

[0033] A diol component carries out an example. **** Moreover, ethylene glycol, 1, 3-propylene glycol, A trimethylene glycol, tetramethylene glycol, 1, 4-butylene glycol,

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EXAMPLE

[Example] In the following examples, many physical properties were measured using the following measuring method. The [melting point] The melting point is temperature when a temperature up flow test is performed using a flow tester (Shimazu flow-tester CFT-500: Shimadzu) and 4mm plunger descends. The conditions of a temperature up flow test are as follows.

[0053]

Die 1mmx1mmphi Temperature up temperature A part for 6-degree-C/ Sample 1.5g Pellet Load 20kgf Preheat temperature 60 degrees C Preheating time 300 seconds [0054] [Glass transition point] The glass transition point was measured using the differential scanning calorimeter (DSC-20: SEIKO electron). It asked from the temperature up endoergic curve for programming-rate/of 5 degrees C.

[0055] [Conductivity] The conductivity of a toner was measured using the dielectric loss measuring device (TR-10C, WBG-9, BDA-9, SE-43, TO-10: Ando Electric). A Measuring condition is as follows.

Applied voltage 200 degrees C Electrode surface product 2.2cm2 Frequency 1000Hz sample 0.07g (500kg pile/cm2 what carried out tablet shaping in the bottom)

[0056] [Saturation magnetization] The saturation magnetization of a toner was measured using the oscillating sample mold magnetometer (VSM model PHV-55 and Riken Electron). Toner about 0.2g is put into a sample capsule, magnetic field strength is strengthened gradually, and they are 10kOe(s). The magnetic susceptibility in strength was measured and magnetic susceptibility per unit weight was made into saturation magnetization (emu/g).

[0057] [Example 1] Binders 1-5 were made as an experiment using the isophthalic acid which can introduce the structure which a carbonyl group combines with cis- grade, the ortho position, or the meta position through a double bond or the benzene ring as a dicarboxylic acid component, a FUTARU acid, a maleic acid, and the terephthalic acid that introduces the structure combined with the para position through the benzene ring, using ethylenediamine as diamine (Table 1). the structure where a carbonyl group combines binders 2-5 with cis- grade, the ortho position, or the meta position through a double bond or the benzene ring -- more than 20 mol % -- it contains. The obtained binders 2-4 are formless, and are 55-59 degree C of Tg(s), and 121-141 degree C of Tm(s). On the other hand, although a binder 1 is crystallinity and is Tm145 degree C, it is Tg42 degree C.

[0058] The binders 5-6 which similarly introduced the structure which combines the amino group with cis- grade, the ortho position, or the meta position through a double bond or the benzene ring, using 1, 2-JI (methylamino) benzene, 1, 3-JI (methylamino) benzene, 1, and 4-JI (methylamino) benzene as a diamine component, and the binder 7 combined with Para were made as an experiment (Table 2). Although binders 5-6 are formless and it is fitness Tg and Tm, a binder 8 is crystallinity and are un-fitness Tg and Tm.

[0059] It is clear from the above thing that it is possible to reduce Tm remarkably by including the structure which combines a carbonyl group or the amino group with cis- grade, the ortho position, or the meta position through a double bond or the benzene ring.

[0060] [Example 2] The binder 10 was made as an experiment using binders 8-9, the succinic acid which does not introduce an unsymmetrical organic radical, and terephthalic acid using the methyl succinic acid which introduces an unsymmetrical organic radical into principal chain structure as a dicarboxylic acid component, and beta-methyl adipic acid, using ethylenediamine as diamine (Table 3). Binders 8-9 are amorphous polymer, and are Tg58 degree C and 58-61 degree C of Tm(s). On the other hand, although a binder 10 is crystallinity and is Tg41 degree C, it is Tm183 degree C.

[0061] The binder 15 was made as an experiment using 1 and 3-diaminopropane which does not introduce [similarly] binders 11-14 and an unsymmetrical organic radical using 1 which introduces an unsymmetrical organic radical, 2-diaminopropane, 1, 2-diamino butane, 1, 3-diamino butane, the 2-methyl -2, and 4-diamino pentane into principal chain

structure as diamine (Table 4). Binders 11-14 are amorphous polymer, and are 58-65 degree C of Tg(s), and 121-125 degree C of Tm(s). On the other hand, although a binder 15 is crystallinity and is Tg41 degree C, it is Tm183 degree C.

[0062] It is clear from the above thing by introducing an unsymmetrical organic radical into principal chain structure that it is possible to reduce Tm remarkably.

[0063] [Example 3] It is clear from the above-mentioned investigation that there is methyl succinic-acid [for example,], 1, and 3-JI (methylamino) benzene etc., and there is succinic-acid, 1, and 4-JI (methylamino) benzene etc. as a monomer which does not check crystallinity as a monomer which checks the crystallinity of a polymer. The monomer ratio required in order to obtain amorphous polymer was investigated using these monomers (Tables 5 and 6).

[0064] in order to obtain amorphous polymer -- structure (a) or (b) -- the principal chain structure whole -- so much -- more than 20 mol % -- it is clear that it is the case where it contains.

[0065] [Example 4] Using the above-mentioned amorphous polymer, the toners 1-20 of straight polarity were made as an experiment, and flash plate fixable, blocking nature, and electrification stability were investigated. Toner presentations are the binder resin 90 weight section, the Nigrosine color (oil black BY, ORIENT chemistry) 5 weight section, and the carbon black (black PARUZUL, Cabot) 5 weight section. Furthermore, it considered as the developer using the toner 5 weight section and the indeterminate form iron powder carrier (TSV 100-200, powder tech) which were made as an experiment.

[0066] First, in order to evaluate flash plate fixable, the solid image of 5mm angle was printed using the FACOM-6715D laser beam printer which has adopted the flash plate fixing method, and the tape friction test was performed. At this time, using the capacitor with a capacity of 160 micro F, the setups of a fixing assembly set to charge electrical-potential-difference 2050V, and were impressed to the flash lamp. Moreover, toner thickness of the solid image on a record medium was set to about 15 micrometers. The tape friction test stuck lightly adhesive tape (Scotch whisky noodle DIN KUTEPU, Sumitomo 3M) on the solid image section, rolled the iron cylinder block with a diameter [of 100mm], and a thickness of 20mm in the condition of having made the record medium sticking a tape top with constant speed at a circumferencial direction, and tore off the tape from the record medium after an appropriate time. As a fixable index, the fixable quality was judged from the magnitude of the ratio (percentage) of the optical image concentration before and behind tape exfoliation (ID), and this ratio made good [fixable] 80% or more of thing. Optical image concentration was measured using PCM meter (Macbeth).

[0067] Moreover, toner 20g was put in Pori Bin, and the storage stability and blocking nature of a toner were exposed into 55 degrees C and the 30%RH environment for 12 hours, they removed the toner below 200 meshes (75 micrometers) from the taken-out toner, and evaluated storage stability and blocking nature from the magnitude of the toner weight which remained. The case where the toner weight which remained was less than [10wt%] was made good.

[0068] The stability of the toner property by change of the operation environment (temperature, humidity) of equipment 10g of developers used by fixable evaluation is put in 50 cc Pori Bin. Ordinary temperature, It was exposed for 1 hour into the normal-relative-humidity environment (25 degrees C, 40%RH), and an elevated temperature and a high-humidity environment (35 degrees C, 80%RH), and the amount measurement of electrifications of the developer which carried out ball mill churning (200rpm) for 10 minutes and which was taken out in each environment was carried out further promptly. It evaluated from the magnitude of the ratio (percentage) of the amount of electrifications in ordinary temperature, the elevated temperature over the amount of electrifications in a normal-relative-humidity environment, and a high humidity environment. This ratio made good 70% or more of case.

[0069] An evaluation result is shown in Table 7. It is clear from a result that the toner using a binder with a glass transition temperature of 55 degrees C or more is excellent in blocking nature and electrification stability, and the toner 150 degrees C or less excels [melting point] in flash plate fixable. Furthermore, the toners 5, 11, 12, 16, 19, and 20 using the glass transition temperature of 55 degrees C or more and amorphous polymer with a melting point of 150 degrees C or less are excellent in both thermal stability electrification stability and flash plate fixable.

[0070] [Example 5] The binder blend toners 21-25 were made as an experiment using a binder 8 and polyester (a bisphenol A diethylene oxide-terephthalate polymer, Mw12000, Tg63 degree C, Tm158 degree C). The addition of a color and carbon was made into the same conditions as an example 4, and was similarly estimated as the example 4. if the rate of polyester without flash plate fixable increases, although flash plate fixable will fall -- the total amount of resin -- receiving -- a binder 8 -- more than 50wt% -- the toner contained is satisfactory to flash plate fixable.

[0071]

[Table 1]

表 1 バインダの特性 (1)

名 称	ジオール成分	ジアミン成分	T _g	T _m	結晶性
バインダ 1	テレフタル酸	エチレンジアミン、 ヘキサメチレンジアミン	42	145	結 晶
バインダ 2	イソフタル酸		58	139	無定形
バインダ 3	フタル酸	ヘキサメチレンジアミン、 1, 2-ジ (メチルアミノ) ベンゼン	59	121	無定形
バインダ 4	マレイン酸、 テレフタル酸		55	141	無定形

[0072]

[Table 2]

表 2 バインダの特性 (2)

名 称	ジオール成分	ジアミン成分	T _g	T _m	結晶性
バインダ 5	テレフタル酸	エチレンジアミン 1, 2-ジ (メチルアミノ) ベンゼン	61	126	無定形
バインダ 6	テレフタル酸	1, 3-ジ (メチルアミノ) ベンゼン	58	127	無定形
バインダ 7	コハク酸	1, 4-ジ (メチルアミノ) ベンゼン	48	147	結 晶

[0073]

[Table 3]

表 3 バインダの特性 (3)

名 称	ジオール成分	ジアミン成分	T _g	T _m	結晶性
バインダ 8	メチルコハク酸	エチレンジアミン 1, 4-ジ (メチルアミノ) ベンゼン	58	129	無定形
バインダ 9	β -メチルアジピン酸		58	125	無定形
バインダ 10	テレフタル酸 コハク酸	エチレンジアミン	41	183	結 晶

[0074]

[Table 4]

表 4 バインダの特性 (4)

名 称	ジオール成分	ジアミン成分	Tg	Tm	結晶性
バインダ11	テレフタル酸	1, 2-ジアミノ プロパン 1, 3-ジアミノ ブタン	65	121	無定形
バインダ12	テレフタル酸	1, 2-ジアミノ ブタン	61	124	無定形
バインダ13	イソフタル酸	1, 3-ジアミノ ブタン	59	123	無定形
バインダ14	テレフタル酸	2-メチル-2, 4-ジアミノペン タン	58	125	無定形
バインダ15	コハク酸	1, 3-ジアミノ プロパン	41	125	結 晶

[0075]

[Table 5]

表 5 バインダの特性 (5)

名 称	ジオール成分	ジアミン成分	比率	Tg	Tm	結晶性
バインダ16	<u>メチルコハク酸</u> <u>イソフタル酸</u>	1, 4-ジ (メチルアミ ノ) ベンゼン ヘキサメチレ ンジアミン	50	65	115	無定形
バインダ17	<u>メチルコハク酸</u> <u>コハク酸</u>	エチレンジア ミン 1, 4-ジ (メチルアミ ノ) ベンゼン	40	62	134	無定形
バインダ18	<u>メチルコハク酸</u> <u>コハク酸</u>	<u>1, 2-ジア ミノプロパン</u> 1, 4-ジ (メチルアミ ノ) ベンゼン	20	56	149	無定形
バインダ7	コハク酸 テレフタル酸	1, 4-ジ (メチルアミ ノ) ベンゼン	0	38	155	結 晶

[0076]

[Table 6]

表6 バインダの特性 (6)

名 称	ジオール成分	ジアミン成分	比率	T _g	T _m	結晶性
バインダ 1	テレフタル酸	エチレンジアミン ヘキサメチレンジアミン	0	42	145	結 晶
バインダ 19	マレイン酸 テレフタル酸	1, 3 - ジ (メチルアミノ) ベンゼン エチレンジアミン	20	63	129	無定形
バインダ 20	マレイン酸 メチルコハク酸 テレフタル酸	1, 4 - ジ (メチルアミノ) ベンゼン	40	65	127	無定形

[0077]

[Table 7]

表7 トナーの特性(1)

名 称	名 称	フ ラ ッ シ ュ 性 定 着 性	ブ ロ ッ キ ン グ 性	帯 電 安 定 性
トナー1	バインダ1	×	×	×
トナー2	バインダ2	△	△	○
トナー3	バインダ3	○	△	○
トナー4	バインダ4	△	△	△
トナー5	バインダ5	○	○	○
トナー6	バインダ6	○	△	○
トナー7	バインダ7	×	×	×
トナー8	バインダ8	○	△	△
トナー9	バインダ9	△	△	○
トナー10	バインダ10	×	×	×
トナー11	バインダ11	○	○	○
トナー12	バインダ12	○	○	○
トナー13	バインダ13	○	△	○
トナー14	バインダ14	○	△	○
トナー15	バインダ15	○	×	×
トナー16	バインダ16	○	○	○
トナー17	バインダ17	△	○	○
トナー18	バインダ18	△	○	○
トナー19	バインダ19	○	○	○
トナー20	バインダ20	○	○	○

[0078]

[Table 8]

表8 トナーの特性(2)

名 称	フ ラ ッ シ ュ 定 着 性 ポリイミド/ポリエステル	フ ラ ッ シ ュ 定 着 性	ブ ロ ッ キ ン グ 性	帯 電 安 定 性
トナー 21	100/100	○	△	△
バインダ22	80/20	○	○	○
バインダ23	50/50	○	○	○
バインダ24	30/70	×	○	○
バインダ25	0/100	×	○	○

[0079] [Example 6] Binders 31-41 were made as an experiment, using terephthalic acid, isophthalic acid, a FUTARU acid, a maleic acid, boletic acid, a succinic acid, and a methyl succinic acid as a dicarboxylic acid component, using ethylene glycol, bisphenol A mold diethylene oxide, 1, 2-propylene glycol, 1, 3-propylene glycol, 1, 2-butylene glycol, 1, 3-butylene glycol, and neopentyl glycol as diol (Table 9). The obtained binders 32-34 are formless, and are 56-71 degree C of Tg(s), and 117-123 degree C of Tm(s). On the other hand, although it is Tg63 degree C, it is Tm131 degree C, it is crystallinity, the melting point is high, and although a binder 35 is Tm118 degree C, a binder 31 is Tg53 degree C and a glass transition point is low [a binder / a binder / it is crystallinity, and].

[0080] It is clear from the above result that FUTARU acid, isophthalic acid, maleic-acid, 1, 2-propylene glycol, 1, 2-butylene-glycol, 1, and 3-butylene glycol's it is the monomer which checks the crystallinity of a polymer. Using the above-mentioned polymer, the toners 31-41 of straight polarity were made as an experiment, and flash plate fixable, blocking nature, and electrification stability were investigated. Toner presentations are the binder resin 90 weight section, the Nigrosine color (oil black BY, ORIENT chemistry) 5 weight section, and the carbon black (black PARUZUL, Cabot) 5 weight section. Furthermore, it considered as the developer using the toner 5 weight section and the indeterminate form iron powder carrier (TSV 100-200, powder tech) which were made as an experiment.

[0081] First, in order to evaluate flash plate fixable, the solid image of 5mm angle was printed using FACOM-6715 laser beam printer which has adopted the flash plate fixing method, and the tape friction test was performed. At this time, using the capacitor with a capacity of 160 micro F, the setups of a fixing assembly set to charge electrical-potential-difference 2050V, and were impressed to the flash lamp. Moreover, toner thickness of the solid image on a record medium was set to about 15 micrometers.

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2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the mimetic diagram of the electrophotography equipment of a flash plate fixing method.

[Description of Notations]

5 -- Developer

10 -- Toner

12 -- Printing paper

13 -- Xenon lamp

[Translation done.]

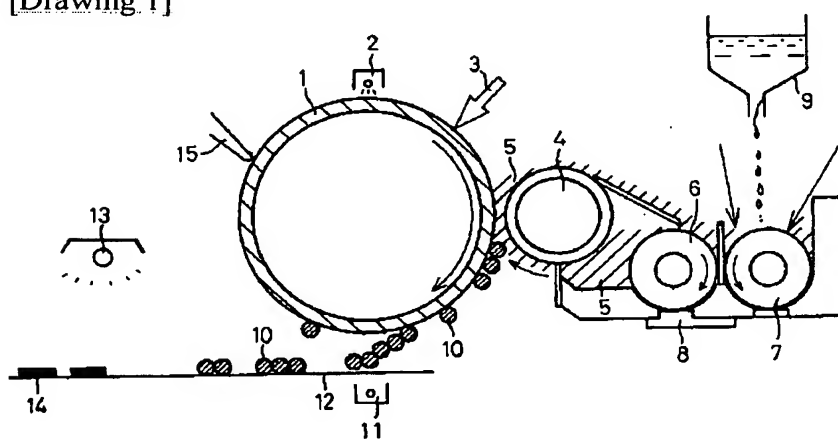
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3. In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



[Translation done.]

(11) JP-7-013385-U

(43) March 7, 1995

(71) Taito Corp.

(54) BINGO GAME MACHINE

(57) ABSTRACT

[Purpose]

The present invention provides a playing field in which flaws are eliminated from the top surface thereof, and that is equally visible from either side when a plurality of players are playing the game.

[Constitution]

A sloped playing field portion 11 supported to pivot freely around a central pivotal axis 12, having a plurality of pockets 11a—m positioned axisymmetrically relative to the central axis thereof; ball lifting means 31—1 and 31—2 disposed at an upper and lower side of the playing field, for upwardly ejecting a previously stored or collected balls to the higher side of the upper surface of the playing field; and a slope driving means 15, 16, and 17 for reversing the slope of the playing field portion 11 a predetermined number of times each game are provided.

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【実用新案登録請求の範囲】

【請求項 1】 傾斜したプレーフィールド上に複数のポケットが設けられ、そのプレーフィールドの上辺側から下辺側に所定個数のボールを転がして、そのボールが入ったポケットに対応する番号の数字の並び方によって勝敗を決めるビンゴゲーム機において、傾斜中心軸回りに傾斜自在に支持され、その中心軸の中心点に対して点対称に配置された複数のポケットを有するプレーフィールド部材と、前記プレーフィールド部材の上辺側及び下辺側に配置され、予め蓄えられた又は回収したボールを、その上辺よりも上側まで上昇させて発射するボールリフト手段と、前記プレーフィールド部材の傾斜を所定のゲーム回数毎に反転させる傾斜駆動手段とを備えたことを特徴とするビンゴゲーム機。

【請求項 2】 請求項 1 に記載のビンゴゲーム機において、前記プレーフィールド部材は、前記ポケットに対応する数字を可変可能に表示する数字表示手段を有することを特徴とするビンゴゲーム機。

【図面の簡単な説明】

【図 1】本考案によるビンゴゲーム機の実施例の構成を示す外観斜視図である。

【図 2】本考案によるビンゴゲーム機の実施例の構成を示す断面図である。

【図 3】実施例に係るビンゴゲーム機の傾斜装置を示す説明図である。

【図 4】実施例に係るビンゴゲーム機の傾斜装置を示す説明図である。

【図 5】実施例に係るビンゴゲーム機を示すブロック図である。

【図 6】実施例に係るビンゴゲーム機の操作パネルの説明図である。

【図 7】実施例に係るビンゴゲーム機の 3 並び表示を示す説明図である。

【図 8】実施例に係るビンゴゲーム機の数字移動手段を示す説明図である。

【図 9】実施例に係るビンゴゲーム機のベット数と有効ラインを説明する図である。

【図 10】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 11】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 12】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 13】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

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【図 14】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 15】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 16】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 17】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 18】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 19】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 20】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 21】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 22】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 23】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 24】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 25】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 26】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 27】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 28】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 29】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

【図 30】実施例に係るビンゴゲーム機の動作を説明するモニタ画面を示す図である。

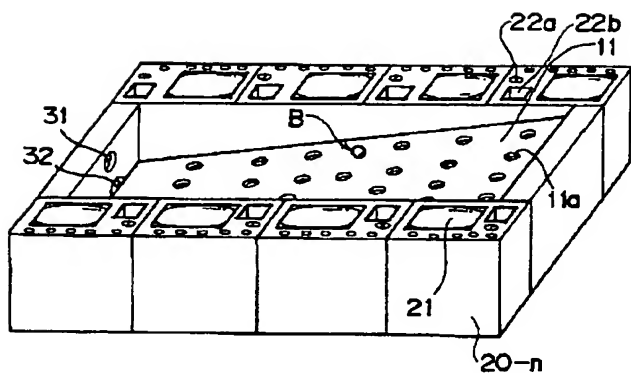
【図 31】実施例に係るビンゴゲーム機の動作を説明する流れ図である。

【図 32】実施例に係るビンゴゲーム機の動作を説明する流れ図である。

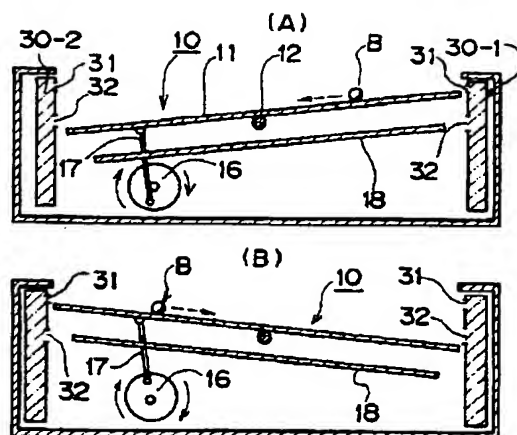
【符号の説明】

- 10 傾斜装置
- 11 プレーフィールド板
- 15 モータ
- 16 回転板
- 17 リンクアーム
- 20 ターミナルキャビネット
- 30 ボールリフト装置
- 40 コントローラ

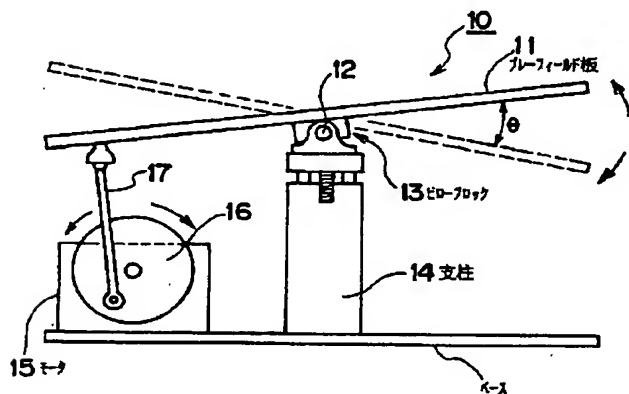
【図1】



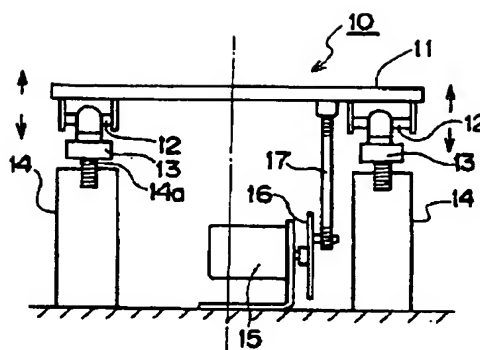
【図2】



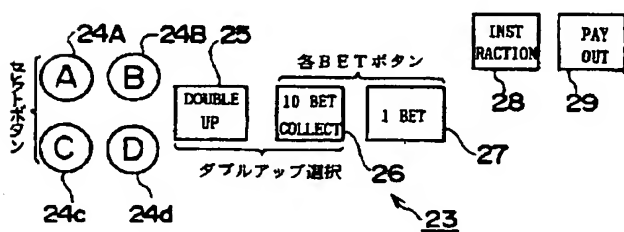
【図3】



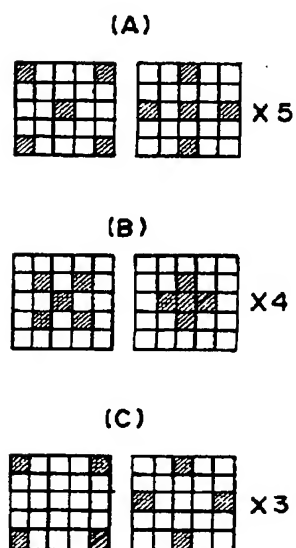
【図4】



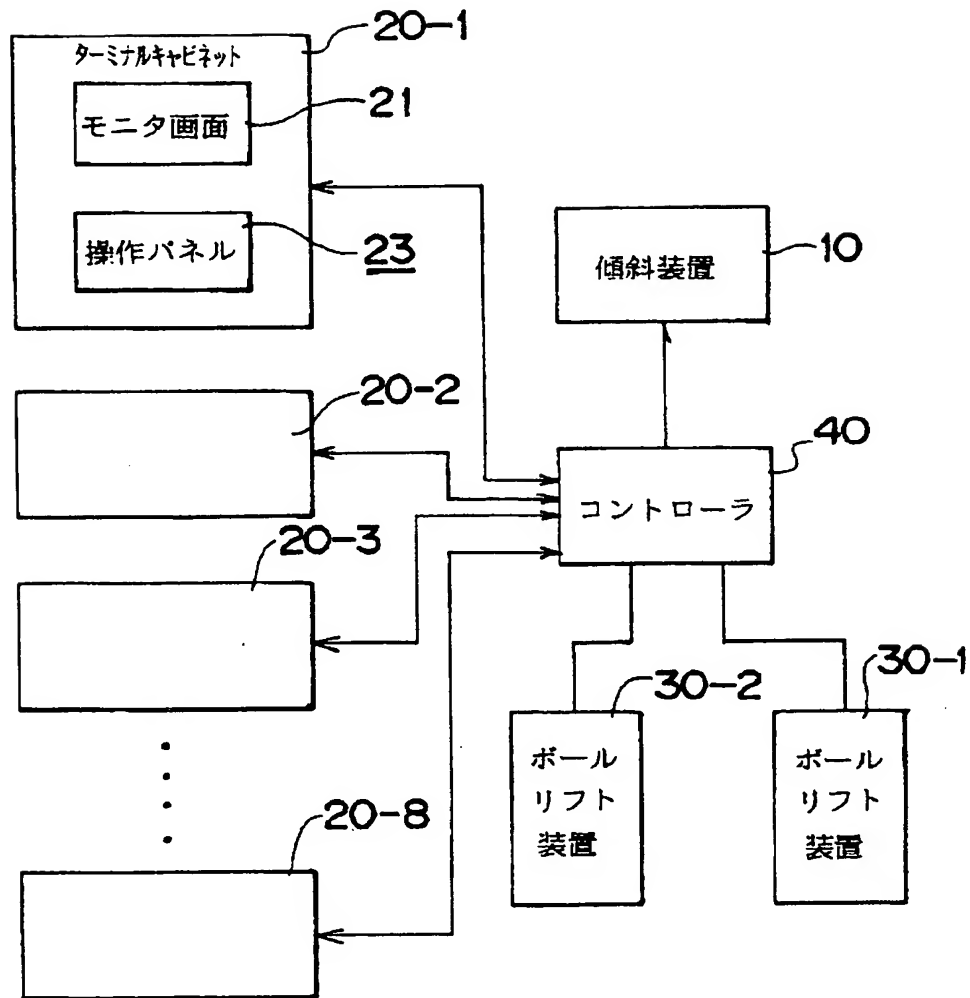
【図6】



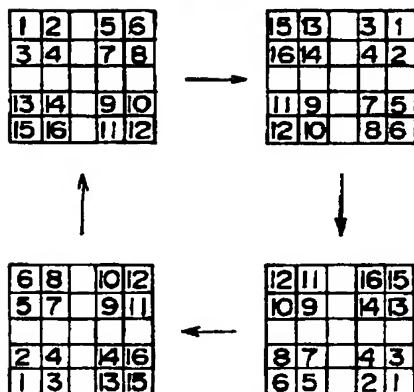
【図7】



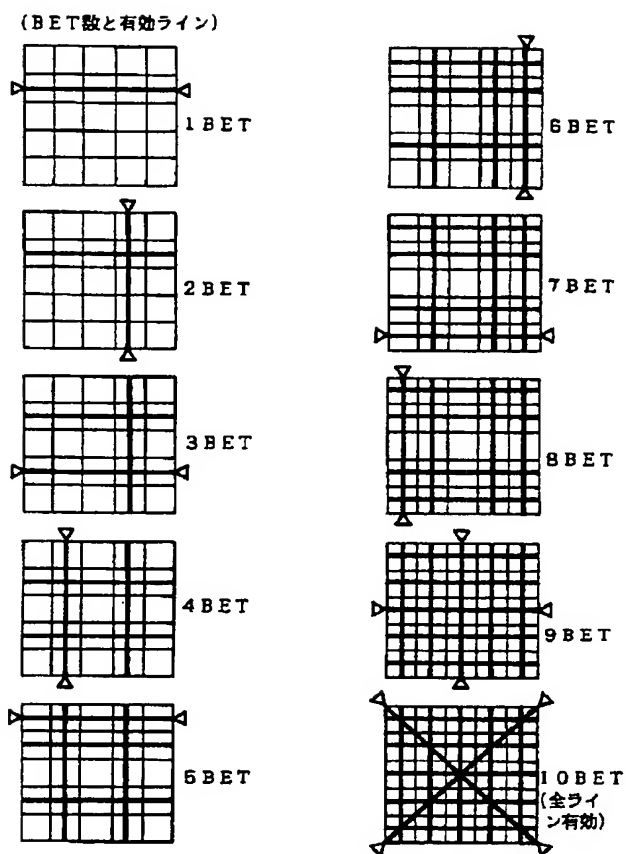
【図5】



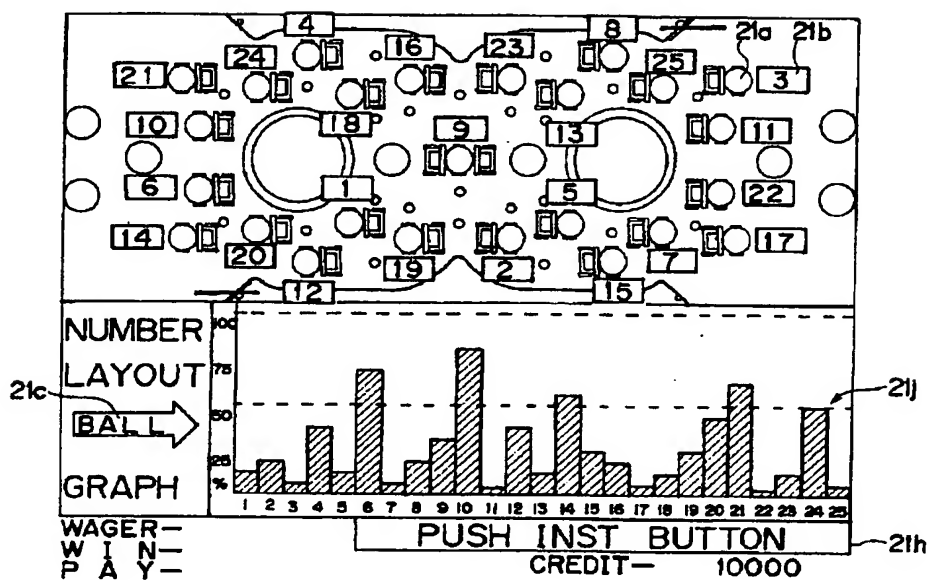
【図8】



【図9】



【図10】



ODDS

5並び	60	120	300	700	1100	1500	2500	3500	5000	10000
4並び	25	50	100	250	375	500	750	1200	2000	3000
3並び	5	10	20	50	75	100	150	200	350	500

※オッズのランクアップは、BET枚数と各カードのナンバー配列により異なります。

※但し、上記の役に該当するには全ライン有効（10BET以上）にしなければなりません。

WAGER-
WIN-
PAY-

PUSH INST BUTTON

CREDIT- 10000

【图 1 2】

2d-C

13	C
7	BET
24	5並び
15	4並び
9	3並び

→

2d-D

6	10	4	11	24	D
15	25	16	8	21	BET
23	14	2	17	18	5並び
19	1	13	3	22	4並び
5	20	9	12	7	3並び

WAGER—
WIN—
PAY—

GOOD LUCK
CREDIT— 10000

【図13】

21d-A					21d-b							
2	1	A	2	20	4	16	B	C	D			
6	20	BET	3	17	10	8	BET	BET	BET			
4	12	5並び	5	23	6	22	5並び	5並び	5並び			
2	10	4並び	1	5	14	2	4並び	4並び	4並び			
4	5	3並び	4	1	25	19	3並び	3並び	3並び			

5並び	60	120	300	700	1100	1500	2500	3500	5000	10000
4並び	25	50	100	250	375	500	750	1200	2000	3000
3並び	5	10	20	50	75	100	150	200	350	500

WAGER —
WIN —
PAY —

GOOD LUCK
CREDIT — 10000

【図14】

21d-A								
19	6	13	22	1	A	B	C	D
4	25	7	16	20	BET	BET	BET	BET
23	9	18	24	12	5並び	5並び	5並び	5並び
8	15	21	2	10	4並び	4並び	4並び	4並び
17	3	11	14	5	3並び	3並び	3並び	3並び

5並び	60	120	300	700	1100	1500	2500	3500	5000	10000
4並び	25	50	100	250	375	500	750	1200	2000	3000
3並び	5	10	20	50	75	100	150	200	350	500

WAGER —
WIN —
PAY —

BET OR CARD SELECT
CREDIT — 10000

【図15】

					21f	A	B	C	D
19	6	13	22	1	BET	BET	BET	BET	
4	25	7	16	20	2				
23	9	18	24	12	6並び	5並び	5並び	6並び	
8	15	21	2	10	60				
17	3	11	14	5	4並び	4並び	4並び	4並び	
					25				
					3並び	3並び	3並び	3並び	
					5				

5並び	60	120	300	700	1100	1500	2500	3500	5000	10000
4並び	25	50	100	250	375	500	750	1200	2000	3000
3並び	5	10	20	50	75	100	150	200	350	500

WAGER — 2
WIN —
PAY —

BET OR CARD SELECT
CREDIT — 9998

【図16】

					21g	A	B	C	D
19	6	13	22	1	BET	BET	BET	BET	
4	25	7	16	20	10				
23	9	18	24	12	6並び	5並び	5並び	6並び	
8	15	21	2	10	120				
17	3	11	14	5	4並び	4並び	4並び	4並び	
					50				
					3並び	3並び	3並び	3並び	
					10				

5並び	60	120	300	700	1100	1500	2500	3500	5000	10000
4並び	25	50	100	250	375	500	750	1200	2000	3000
3並び	5	10	20	50	75	100	150	200	350	500

WAGER — 10
WIN —
PAY —

BET OR CARD SELECT
CREDIT — 9990

【図17】

21d-A					21d-B							
2	1	A	2	20	4	16	B	C	D			
6	20	BET	3	17	10	8	BET	BET	BET			
4	12	5並び	5	23	6	22	5並び	5並び	5並び			
2	10	4並び	1	5	14	2	4並び	4並び	4並び			
4	5	3並び	4	1	25	19	3並び	3並び	3並び			
		10										

5並び	60	120	300	700	1100	1500	2500	3500	5000	10000
4並び	25	50	100	250	375	500	750	1200	2000	3000
3並び	5	10	20	50	75	100	150	200	350	500

WAGER — 10
 WIN —
 PAY —

B-CARD SELECT
 CREDIT- 9990

【図18】

21d-B							
15	13	20	4	16	B	C	D
9	21	17	10	8	BET	BET	BET
12	3	23	6	22	5並び	5並び	5並び
24	11	5	14	2	4並び	4並び	4並び
7	18	1	25	19	3並び	3並び	3並び

5並び	60	120	300	700	1100	1500	2500	3500	5000	10000
4並び	25	50	100	250	375	500	750	1200	2000	3000
3並び	5	10	20	50	75	100	150	200	350	500

WAGER — 10
 WIN —
 PAY —

B-CARD SELECT
 CREDIT- 9990

【図19】

15	13	20	4	16	B	C	D	A
9	21	17	10	8	BET	BET	BET	BET
12	3	23	6	22	5並び	5並び	5並び	10
24	11	5	14	2	4並び	4並び	4並び	120
7	18	1	25	19	3並び	3並び	3並び	50
								10

5並び	60	120	300	700	1100	1500	2500	3500	5000	10000
4並び	25	50	100	250	375	500	750	1200	2000	3000
3並び	5	10	20	50	75	100	150	200	350	500

WAGER = 10 BET OR CARD SELECT
 W P A N CREDIT- 9990

【図20】

15	13	20	4	16	B	C	D	A
9	21	17	10	8	BET	BET	BET	BET
12	3	23	6	22	20	5並び	5並び	10
24	11	5	14	2	300	4並び	4並び	120
7	18	1	25	19	100	3並び	3並び	50
					20			10

5並び	60	120	300	700	1100	1500	2500	3500	5000	10000
4並び	25	50	100	250	375	500	750	1200	2000	3000
3並び	5	10	20	50	75	100	150	200	350	500

WAGER = 30 BET OR CARD SELECT
 W P A N CREDIT- 9970

【図21】

6	10	4	11	24	D	A	B	C		
15	25	16	8	21	BET	BET	BET	BET		
23	14	2	17	18	25	10	20	5		
19	1☆	13	3	22	5並び	5並び	5並び	5並び		
5	20	9	12	7	700	120	300	60		
					4並び	4並び	4並び	4並び		
					250	50	100	25		
					3並び	3並び	3並び	3並び		
					50	10	20	5		
5並び	60	120	300	700	100	1500	2500	3500	5000	10000
4並び	25	50	100	250	375	500	750	1200	2000	3000
3並び	5	10	20	50	75	100	150	200	350	500
WAGER-	60	BET OR CARD SELECT								
WIN-		CREDIT-								
PAY-		9940								

【図22】

6	10	4	11	24	D	A	B	C
15	25	16	8	21	BET	BET	BET	BET
23	14	2	17	18	35	10	20	5
19	1☆	13	3	22	5並び	5並び	5並び	5並び
5	20	9	12	7	1100	120	300	60
					4並び	4並び	4並び	4並び
					375	50	100	25
					3並び	3並び	3並び	3並び
					75	10	20	5

5並び	60	120	300	700	1100	1500	2500	3500	5000	10000
4並び	25	50	100	250	375	500	750	1200	2000	3000
3並び	5	10	20	50	75	100	150	200	350	500

WAGER- 70
WIN-
PAY-
BET TIME LAST 10sec
CREDIT- 9930

【図 23】

21d-A

19	6	13	22	1	A CARD
4	25	7	16	20	BET 10
23	9	18	24	12	5並び 64
8	15	21	2	10	4並び 24
17	3	11	14	5	3並び 8

21d-B

15	13	20	4	16	B CARD
9	21	17	10	8	BET 20
12	3	23	6	22	5並び 80
24	11	5	14	2	4並び 30
7	18	1	25	19	3並び 10

21d-C

11	3	20	8	13	C CARD
6	19	23	12	7	BET 5
22	17	1	25	24	5並び 50
14	2	18	4	15	4並び 18
5	10	21	16	9	3並び 6

21d-D

6	10	4	11	24	D CARD
15	25	16	8	21	BET 35
23	14	2	17	18	5並び 128
19	1	13	3	22	4並び 48
5	20	9	12	7	3並び 16

10BETされている
カードのみ有効です

3並び ×5倍

3並び ×3倍

WAGER - 70

WIN -

PAY -

GOOD LUCK

CREDIT - 9930

【図 24】

21h

19	6	13	22	1	A CARD
4	25	7	16	20	BET 10
23	9	18	24	12	5並び 64
8	15	21	2	10	4並び 24
17	3	11	14	5	3並び 8

15	13	20	4	16	B CARD
9	21	17	10	8	BET 20
12	3	23	6	22	5並び 80
24	11	5	14	2	4並び 30
7	18	1	25	19	3並び 10

11	3	20	8	13	C CARD
6	19	23	12	7	BET 5
22	17	1	25	24	5並び 50
14	2	18	4	15	4並び 18
5	10	21	16	9	3並び 6

6	10	4	11	24	D CARD
15	25	16	8	21	BET 35
23	14	2	17	18	5並び 128
19	1	13	3	22	4並び 48
5	20	9	12	7	3並び 16

10BETされている
カードのみ有効です

3並び ×5倍

3並び ×3倍

WAGER - 70

WIN -

PAY -

NUMBER 21

CREDIT - 9930

【図25】

19 6 13 22 1	A CARD	15 13 20 4 16	B CARD
4 25 7 16 20	BET 10	9 21 17 10 8	BET 20
23 9 18 24 12	5並び 64	12 3 23 6 22	5並び 80
8 15 21 2 10	4並び 24	24 11 5 14 2	4並び 30
17 3 11 14 5	3並び 8	7 18 1 25 19	3並び 10

11 3 20 8 13	C CARD	6 10 4 11 24	D CARD
6 19 23 12 7	BET 5	15 25 16 8 21	BET 35
22 17 1 25 24	5並び 50	23 14 2 17 18	5並び 128
14 2 18 4 15	4並び 18	19 13 3 22	4並び 48
5 10 21 16 9	3並び 6	5 20 9 12 7	3並び 16

10BETされている
カードのみ有効です

3並び ×5倍 3並び ×3倍

WAGER - 70 NUMBER 18
WIN -
PAY - CREDIT - 9930

【図26】

19 6 13 22 1	A CARD	15 13 20 4 16	B CARD
4 25 7 16 20	BET 10	9 21 17 10 8	BET 20
23 9 18 24 12	5並び 64	12 3 23 6 22	5並び 80
8 15 21 2 10	4並び 24	24 11 5 14 2	4並び 30
17 3 11 14 5	3並び 8	7 18 1 25 19	3並び 10

11 3 20 8 13	C CARD	6 10 4 11 24	D CARD
6 19 23 12 7	BET 5	15 25 16 8 21	BET 35
22 17 1 25 24	5並び 50	23 14 2 17 18	5並び 128
14 2 18 4 15	4並び 18	19 13 3 22	4並び 48
5 10 21 16 9	3並び 6	5 20 9 12 7	3並び 16

10BETされている
カードのみ有効です

3並び ×5倍 3並び ×3倍

WAGER - 70 NUMBER 2
WIN -
PAY - CREDIT - 9930

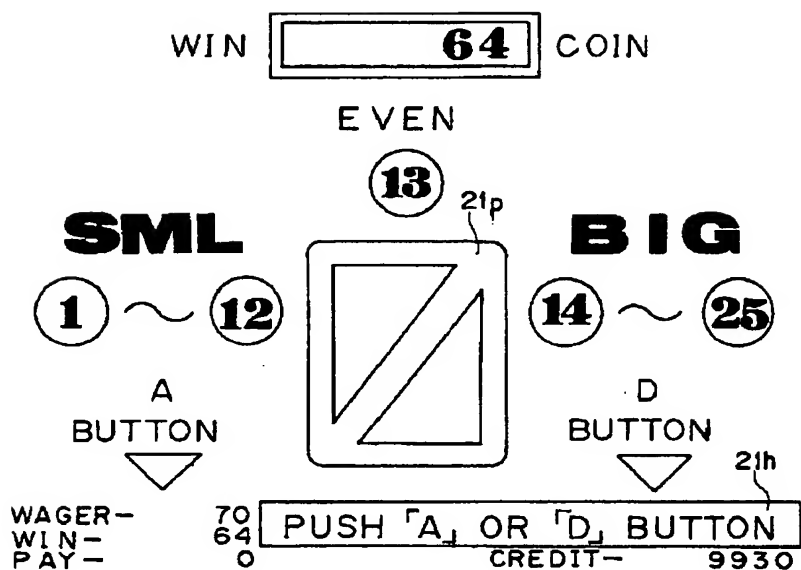
【図27】

<div>19613221</div> <div>4251620</div> <div>239182412</div> <div>81521210</div> <div>7311145</div>					<div>21m A CARD</div> <div>BET 10</div> <div>5並び 64</div> <div>4並び 24</div> <div>3並び 8</div>					<div>151320416</div> <div>92117108</div> <div>12323622</div> <div>24115142</div> <div>71812519</div>					<div>B CARD</div> <div>BET 20</div> <div>5並び 80</div> <div>4並び 30</div> <div>3並び 10</div>				
<div>11320813</div> <div>61923127</div> <div>221712524</div> <div>14218415</div> <div>51021169</div>					<div>C CARD</div> <div>BET 5</div> <div>5並び 50</div> <div>4並び 18</div> <div>3並び 6</div>					<div>61041124</div> <div>152516821</div> <div>231421718</div> <div>19113322</div> <div>5209127</div>					<div>D CARD</div> <div>BET 35</div> <div>5並び 128</div> <div>4並び 48</div> <div>3並び 16</div>				
A-WIN					48 COINS					B-LOST									
C-LOST										D-WIN									
										16 COINS									
WAGER -					70					YOU WIN 64 COINS									
WIN -					64														
PAY -																			
										CREDIT - 9930									

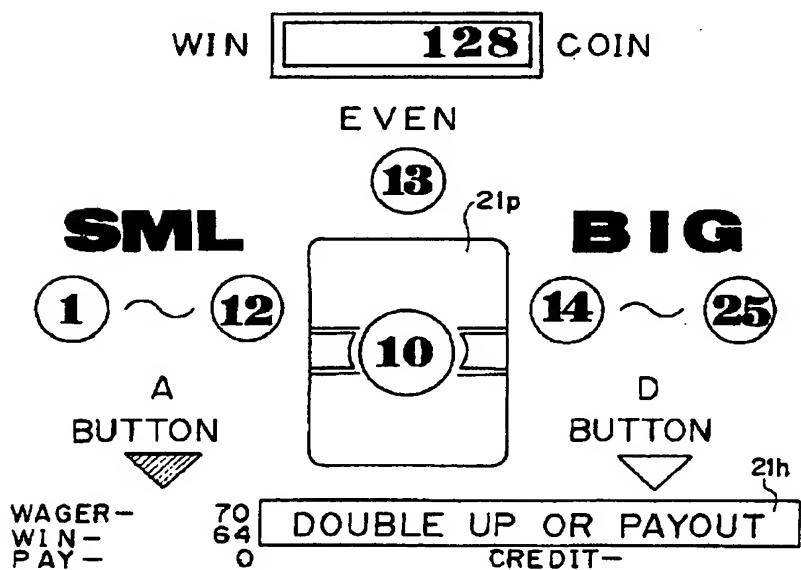
【図28】

<table><tr><td>19</td><td>6</td><td>13</td><td>22</td><td>1</td></tr><tr><td>4</td><td>25</td><td></td><td>16</td><td>20</td></tr><tr><td>23</td><td>9</td><td></td><td>24</td><td>12</td></tr><tr><td>8</td><td>15</td><td></td><td>2</td><td>10</td></tr><tr><td></td><td>3</td><td></td><td>14</td><td>5</td></tr></table> A CARD <table><tr><td>BET</td><td>10</td></tr><tr><td>5並び</td><td>64</td></tr><tr><td>4並び</td><td>24</td></tr><tr><td>3並び</td><td>8</td></tr></table>	19	6	13	22	1	4	25		16	20	23	9		24	12	8	15		2	10		3		14	5	BET	10	5並び	64	4並び	24	3並び	8	<table><tr><td>15</td><td>13</td><td>20</td><td>4</td><td>16</td></tr><tr><td>9</td><td>21</td><td>17</td><td>10</td><td>8</td></tr><tr><td>12</td><td>3</td><td></td><td>6</td><td>22</td></tr><tr><td>24</td><td>11</td><td>5</td><td>14</td><td></td></tr><tr><td></td><td>18</td><td>1</td><td>25</td><td>19</td></tr></table> B CARD <table><tr><td>BET</td><td>20</td></tr><tr><td>5並び</td><td>80</td></tr><tr><td>4並び</td><td>30</td></tr><tr><td>3並び</td><td>10</td></tr></table>	15	13	20	4	16	9	21	17	10	8	12	3		6	22	24	11	5	14			18	1	25	19	BET	20	5並び	80	4並び	30	3並び	10
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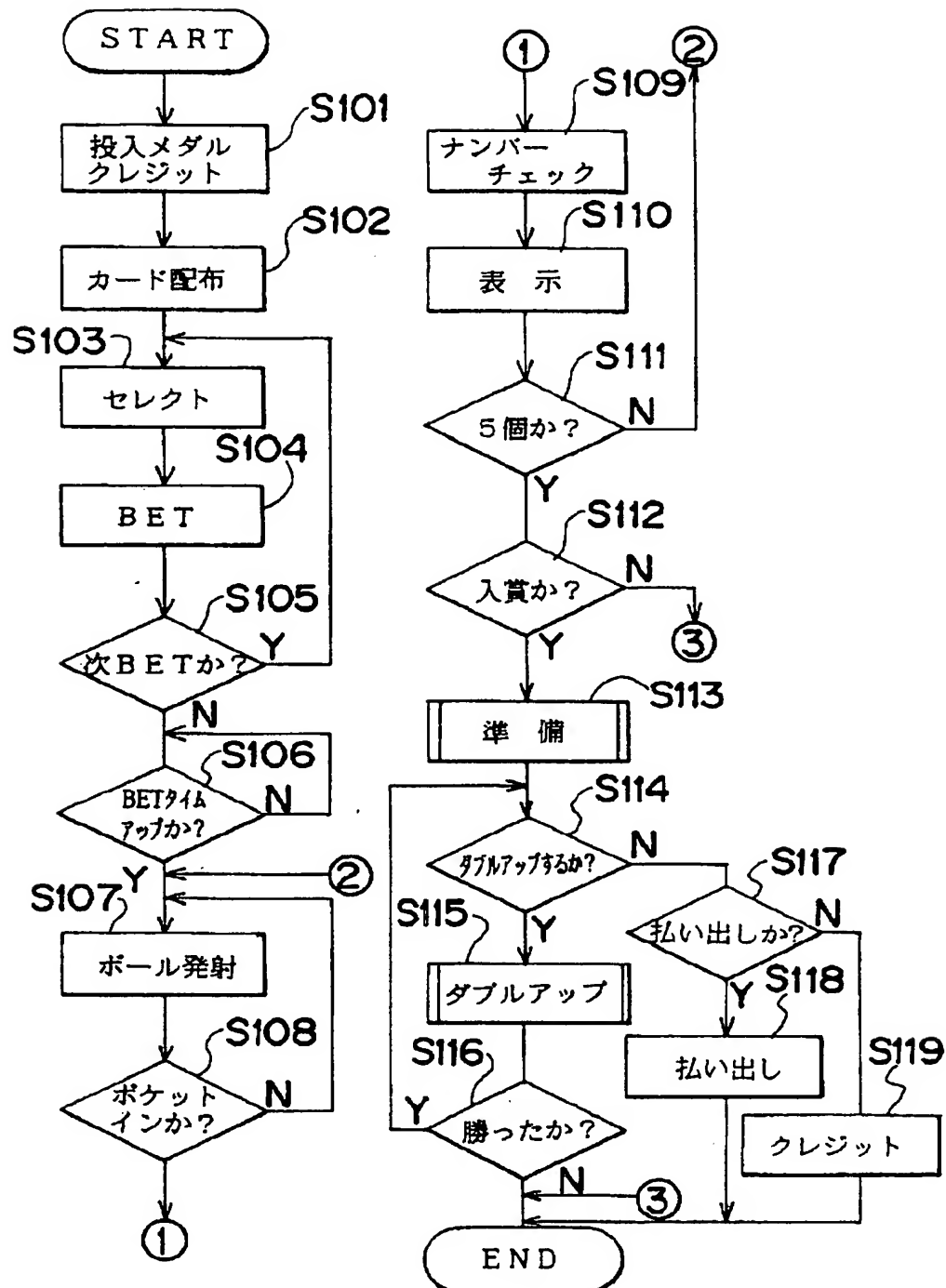
【図29】



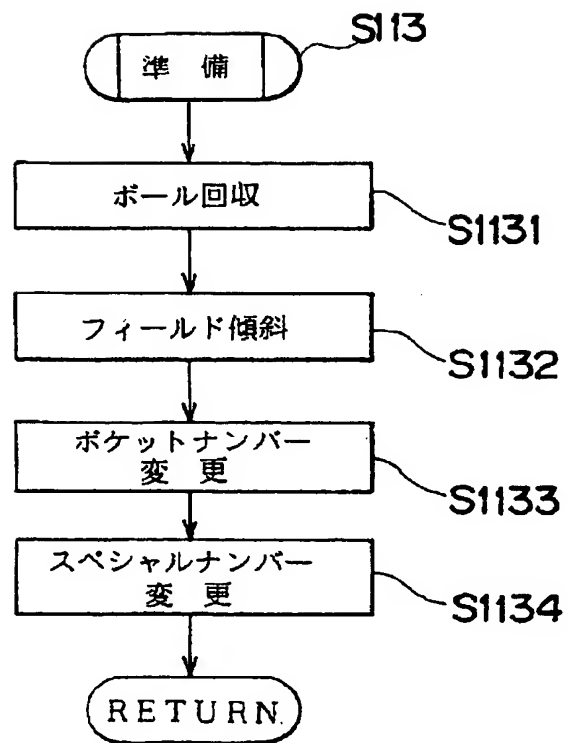
【図30】



【図31】



【図32】



【考案の詳細な説明】**【0001】****【産業上の利用分野】**

本考案は、ピンボールゲーム方式のプレーフィールド上で、ボールを転がしてポケットに入れ、そのポケットに対応する番号による数字の並び方によって勝敗を決めるビンゴゲーム機に関するものである。

【0002】**【従来の技術】**

従来、この種のビンゴゲーム機では、プレーフィールドは固定されており、つねに傾斜方向が一定であり、また、ポケットの番号も一定であった（実公昭49-32214号など）。

【0003】**【考案が解決しようとする課題】**

しかし、前述した従来のビンゴゲーム機では、プレーフィールドの傾きの方向が一定であるために、ボールの転がし方に癖のようなものが出やすく、入りやすいポケットが決まってしまうゲーム性が乏しくなる、という問題があった。

また、プレーフィールドの回りを大勢のプレーヤーが囲んで同時にプレーする、いわゆるマルチビンゴゲーム機においては、相対する側に立つプレーヤーの間では、視野が一方側に固定させるので、平等性に欠けるという問題があった。

【0004】

本考案の目的は、前述の課題を解決し、プレーフィールドの上面の癖を無くすとともに、大勢のプレーヤーがゲームする場合に、何れの側のプレーヤーにも平等に見えるビンゴゲーム機を提供することである。

【0005】**【課題を解決するための手段】**

前記課題を解決するために、本考案によるビンゴゲーム機の第1の解決手段は、傾斜したプレーフィールド上に複数のポケットが設けられ、そのプレーフィールドの上辺側から下辺側に所定個数のボールを転がして、そのボールが入ったポケットに対応する番号の数字の並び方によって勝敗を決めるビンゴゲーム機にお

いて、傾斜中心軸回りに傾斜自在に支持され、その中心軸の中心点に対して点対称に配置された複数のポケットを有するプレーフィールド部材と、前記プレーフィールド部材の上辺側及び下辺側に配置され、予め蓄えられた又は回収したボールを、その上辺よりも上側まで上昇させて発射するボールリフト手段と、前記プレーフィールド部材の傾斜を所定のゲーム回数毎に反転させる傾斜駆動手段とを備えたことを特徴とする。

【0006】

第2の解決手段は、第1の解決手段のビンゴゲーム機において、前記プレーフィールド部材は、前記ポケットに対応する数字を可変可能に表示する数字表示手段を有することを特徴とすることができる。

【0007】

【作用】

本考案によれば、プレーフィールド部材の傾斜を所定のゲーム回数毎に反転させるので、経時的変化により盤面の癖のようなものが発生しにくい。また、ポケットに対応する数字を変更することができるので、特定のポケットに入りやすくなっても、数字の並び方が偏ることもない。

【0008】

【実施例】

以下、図面等を参照して、実施例につき、本考案を詳細に説明する。図1～図5は、本考案によるビンゴゲーム機の実施例の構成を示す図であって、図1は外観斜視図、図2は断面図、図3及び図4は傾斜装置の説明図、図5はブロック図、図6は操作パネルの説明図である。

傾斜装置10は、プレーフィールド板11を左下がり又は右下がりに傾斜させるための装置である。プレーフィールド板11は、その上面にボールBを転がすための板であり、そのボールBを落とし込むそれぞれ番号の付いた複数のポケット11a-1～11a-m（この実施例ではm=25個）が形成されている。これらのポケット11aは、傾斜したときに同一条件になるように、傾斜中心位置から線対称になるように配置されている。このプレーフィールド板11の下側には、ポケット11a-1～11a-mに落ち込んだ後のボールBを回収するため

の回収板18が配置されている。

なお、ボールBは、プレーフィールド板11のポケット10aに落ち込んだ場合に、シャッタ（不図示）により下に落下することなく、半分露出した状態で止まっており、1回のプレーが終了した後に、そのシャッタが開いて回収板18上に落ちることとなる。

【0009】

プレーフィールド板11は、シャフト12を中心にして、図2の時計方向又は反時計方向に回転できるように、ピローブロック13を介して左右の支柱14によって支持されている。ピローブロック13と支柱14の間には、高さ調節ねじ14aが設けられている。ゲーム機の設置時に、床面が傾斜している場合に、ゲーム機の筐体の底部に設けられたアジャスター（不図示）だけでは、水平状態を保つのが難しいことがあるので、高さ調節ねじ14aによって、プレーフィールド板11の左右の高さをそれぞれ調節できるようにした。

【0010】

また、プレーフィールド板11は、正逆回転可能なモータ15、そのモータ15の出力軸に取り付けられた回転板16及びその回転板16の偏心した位置に連結されたリンクアーム17によって、左右に角度 θ （この実施例では約10度）だけ傾け又はその角度に停止することができる。図2（A）は、プレーフィールド板11の右側が高く左側が低い状態を示しており、図2（B）は、プレーフィールド板11が反転して、左側が高く右側が低くなった状態を示している。

このモータ15は、プレーフィールド板11を反転させるだけであれば、一方方向にのみ回転するモータで足りるが、ボールBが万が一プレーフィールド板11上に止まってしまった場合に、プレーフィールド板11を一時的に水平状態まで移動させて、再び元に戻す動作をさせるために、リバーシブルモータを使用している。

なお、プレーフィールド板11は、反転させることだけではなく、同一の傾斜方向であっても、傾斜角度を変えることによって、ゲームに変化を持たせることができる。

【0011】

プレーフィールド板11の長手方向の両側には、プレーヤーがプレーするためのターミナルキャビネット20-1~20-n（この実施例では、n=8個）設けられており、n人までが同時にビンゴゲームを行うことができる。

ターミナルキャビネット20には、モニタ画面21、最初にプレーするときにメダルを投入するメダル投入口22a、メダル払い出し口22bなどが設けられている。このモニタ画面21には、ゲームの進行に応じた画面の表示、CREDIT, WIN, PAY, WAGERのメータなどの表示を行う。モニタ画面21には、ビンゴの数字が並んで表示されており、これに対応した番号のポケット11aにボールBが落ち込むごとに、その数字の色が変わり、5個の数字の色が変わって、一直線上に並べばビンゴとなり、メダル払い出し口22bからメダルがペイアウトされる。

【0012】

プレーフィールド板11の短手方向の両側（上辺側及び下辺側）には、ボールリフト装置30-1、30-2が設けられている。ボールリフト装置30には、ボールBの送出孔31及び外れボール回収孔32がそれぞれ設けられており、前述した回収板18及び外れボール回収孔32から回収されたボールBを、高い位置にある送出孔31の位置まで、不図示の機構により運び上げて送出する。

【0013】

図5に示すように、各ターミナルキャビネット20-1~20-8及び傾斜装置10、リフト装置30-1、30-2などは、このゲームの進行を制御するコントローラ40に接続されている。

プレーフィールド板11が図2の左下がりに傾斜している場合には、右側のボールリフト装置30-1の送出孔31からボールBが1個つづ送出され、プレーフィールド板11上を高い方から低い方向に向かって転がっていく。ボールBは、プレーフィールド板11のポケット11aに入るか、反対側のリフト装置30-2の外れボール回収孔32に回収される。続いて、別のボールBが送出孔31から送出され、合計で5個のポケット11aに入るまで、次々と送出される。

5個のポケット11aにボールBが入ると、ポケット11aの下に配置された不図示のシャッタが開き、回収板17にボールBが落ち、左側のボールリフト装

置20÷2に回収され、1回のゲームが終了する。

その後に、モータ15が回転して、回転板16、クランクアーム17を介して、プレーフィールド板11が図2の時計方向に回転して、図2(B)の状態になり、次ぎのゲームに備える。

【0014】

次に、本考案によるビンゴゲーム機の細部の構成を説明する。

各ターミナルキャビネット20には、モニタ画面21、メダル投入口22a、メダル払い出し口22b等の他に、図6に示すように、セレクトボタン24A～24D、DOUBLE-UPボタン25、10BETボタン26、1BETボタン27、INSTRUCTIONボタン28、PAYOUTボタン29などを有する操作パネル23が設けられており、各ボタンは全て点灯式となっている。

【0015】

セレクトボタン24A～24Dは、ゲーム中にBET（賭けること）を行いたいカードを選ぶためのボタンであり、セレクトボタン24A、24Dについては、後述するダブルアップゲーム時のセレクトボタンとしても使用する。

DOUBLE-UPボタン25は、ビンゴゲームで入賞があった場合に、ダブルアップゲームを行うのに使用する。10BETボタン26は、1度押すだけで10BETできるボタンである。但し、コインが10枚以上クレジットされていなければ、使用できない。1BETボタン27は、1度押すと1BETされるボタンである。ダブルアップゲームを行う場合にはDOUBLE-UPボタン25を押し、行わない場合には10BETボタン26を用いて「COLLECT」機能に流用する。

INSTRUCTIONボタン28は、モニタ画面21を切り換えるためのボタンであり、ゲーム画面→ナンバーレイアウト→オッズ画面→ゲーム画面とサイクリックに画面が切り換わり、常時使用することができる。

PAYOUTボタン29は、メダルを払い出すためのボタンである。また、ゲーム入賞時に、ダブルアップゲームか払い出しかをセレクトする場合にも使用する。

【0016】

次に、この実施例のビンゴゲームの細かいルールについて簡単に説明する。

図7は、実施例に係るビンゴゲーム機の3並び表示を示す説明図である。10 BET以上したカードは、図7に示すような並びによって入賞した場合も有効であって払い出しの対象となり、ODDS 3並びの各表示倍数が払い戻される。

合計BET枚数(WAGER)が10枚以上となった場合には、ビンゴゲームの入賞とは無関係に、次の出目になったときに、払い出しが行われる。すなわち、出目が全て偶数か又は奇数の場合、出目が全て14以上か又は12以下の場合に、払い出しは枚数(BET枚数)×1.5倍となる。

また、各カード毎に、色替えしたラインを1ライン定め、そのラインで入賞すると、ODDSが2倍になる。

なお、重複してできた役は、入賞時に全て払い出される。

【0017】

図8は、実施例に係るビンゴゲーム機の数字移動手段を示す説明図である。ゲームのスタートから4球目のボールBが発射されるまでの間(3球目が発射されて5秒後)に、BETしていたカードの四隅のナンバーを、セレクトボタン24A~24Dを押すことにより、移動させることができる。このようにすれば、さらにゲーム性を増すことができる。

【0018】

図10~図30は、本考案によるビンゴゲーム機の動作を説明するモニタ画面を示す図、図31及び図32は、ゲーム動作を説明する流れ図である。

インストラクションボタン28は、1回押した場合には、図10に示すような画面となる。このときは、モニタ画面21は、主に、プレーフィールド板11に対応するポケット表示21aとナンバー表示21bをキャラクタによってレイアウト表示する。但し、プレーフィールドのレイアウト等は、逆側のターミナルでは、逆方向となるのでソフト上で処理を行って表示する。

【0019】

矢印表示21cは、ボールBの打ち出し方向を示すためのものであり、ゲーム毎、つまりプレーフィールド板11を反転させる毎に、その向きを変更する。また、グラフ表示21jは、現在のナンバー表示21bにおけるポケットインの確

率を示すものである。ナンバー表示21bは、ゲーム毎に変更するので、グラフ表示21jもゲーム毎にポケット位置により変更する。

プレーフィールド板11の各ポケット11aに対して、固定的にナンバーを決めずに毎回変更する理由は、プレーフィールド板11の変形などにより、各ポケット11aに落ち込む確率が偏るのを防ぐためである。なお、プレーフィールド板11上のナンバー表示も、LED等により変えている。

【0020】

再度、インストラクションボタン28を押すと、図11に示すような、オッズ画面となる。そして、もう1度、インストラクションボタン28を押すと、通常ゲーム画面又はBET画面に切り替わる。

【0021】

ゲームが開始されると、図12の画面となり、メダルが投入口22aから投入されると、クレジットされる(図31のS101)。

次に、表示によってA～Dカード21d-A～21d-Dが順次配布される(図31のS102)。まず、Dカード21d-Dが画面の左端より出現し、図13に示すように、Cカード21d-C、Bカード21d-B、Aカード21d-Aの順に配られ、図14に示すように、全て配り終わると、この画面からカードをセレクトし(図31のS103)、順次BETすることができる(図31のS104)。

【0022】

Aカード21d-Aの所定のラインをBETした場合には、図15に示すように、有効ライン表示21e、BET枚数/オッズ表表示21f(カード内)、WAGER表示21gが表れる。なお、BET枚数/オッズ表表示21fは、カラーモード対応により表示される。

【0023】

ここで、ベット数と有効ラインは、例えば、図9に示すように定められており、10BETを行うと、全ライン有効の表示となる。また、全ラインの中から、縦、横、斜めのいずれか1本を、色変りにより表示する。図16の場合には、中央の縦ラインがそれに該当する。

なお、各カードのナンバー部には、星印21kの付いたナンバーが各カード毎にある（個数も位置も異なるが、例えば1～3位）。これは、次ゲーム用のナンバーを決定すると同時に、スペシャルナンバー（例えば、ポケット回りのLEDを通常のものは緑色で点灯し、星印に該当するものは赤色で点滅させる）にボールがポケットインすると、そのナンバーを含めて、星印の付いたナンバーが全てチェックナンバーとなり、役作りの助けとなる。

すなわち、星印の付いたポケット1個にボールが入ると、他の番号であっても関係なく、全ての星印のポケットにボールが入ったのと同じことになる。通常のポケットだけにボールが入った場合は、1枚のカードに点灯する番号は、ボールの個数と同じ5個だけであるが、星印のポケットにボールが入ると、番号が違っていても、星印にも入ったのと同じことになるので、点灯する番号が6～7箇所と多くなり、当たる確率が非常に高くなる。つまり、星印のポケットは、ポーカーゲームのジョーカーに相当すると考えればよい。

【0024】

次に、Bカード21d-Bをセレクトすると、図17に示すように、Aカード21d-Aは、画面の左端に消える。但し、その他のカードが選ばれたときには、そのカードよりも前面にあるカードが全て同時に移動する。

そして、図18に示すように、残りのカードと同時に、セレクトされたBカード21d-Bが、前回のAカード21d-Aのあった位置に移動する。

【0025】

次に、図19の画面で、Bカード21d-Bがセレクトされたことになり、BETすることができる。

ここで、図20に示すように、Bカード21d-BをBETする。前述と同様にして、オッズ、有効ラインを示す矢印などが表示される。また、図21のように、前述と同様にして、各々のカードにBETする（図31のS105）。

BET時間が残り10秒になると、図22に示すように、コメント欄21hにそれを表示し、0までカウントダウンする。

【0026】

BET時間が終了すると（図31のS106）、BET画面がフェイドアウト

し、図23の画面がフェイドインする。同時に、ゲームがスタートし、プレイヤーボード11上では1球目のボールBが発射される(図31のS107)。

モニタ画面の内容は、A～Dの各カード(ナンバー)をBET時より縮小させて、全てのカードナンバーが見えるようなレイアウトにする。また、10BET以上しているカードがあるときにのみ、カードの下部にスペシャルオッズ表示21iが表れる(図7の説明参照)。

【0027】

いま、1球目のボールBがナンバー「21」のポケットに入ったとする。図24に示すように、そのナンバーをチェックして(図31のS109)、全てのカードの「21」をキャラクターの色変え(斜線で示してある)により、表示する(図31のS110)。また、コメント欄21hにも、そのナンバーを表示し、プレイヤーに知らせる。

【0028】

次に、2球目のボールBがナンバー「18」にポケットインしたとする。図25に示すように、ナンバー「18」は、ポケット回りのLEDが赤を表示している箇所である。このため、星印のナンバー部もチェックされる。

同様にして、ゲームが展開され、図26に示すように、5球目のボールBがナンバー「2」にポケットインしたとする。

なお、各ボールが発射されて、いずれのポケットにも入らない場合には、再度ボールを発射する(S108)。

【0029】

5個目のボールがポケットインすると(図31のS111)、図26に示すように、ビンゴゲーム入賞の判定を行う(図31のS112)。

入賞がある場合には、そのカードの入賞ライン及びナンバーを点滅させて、その並び(オッズ)を表示している部分も同時に点滅させる(21m, 21n)。また、スペシャルオッズの表がヘイダウトして消え、各カードの入賞の有無と、入賞があるときには、その枚数を表示する。

コメント欄21hには、図27に示すように、入賞のある場合には「YOU WIN・・・」と表示するが、入賞のない場合には「GAME OVER」と

表示する。

【0030】

入賞した場合には、その払い出し枚数を全て掛けて、ダブルアップゲームを行うことができる（図31のS114）。その旨が、図28に示すように、コメント欄21hに表示される。ダブルアップゲームを選択するときには、DOUBLE UPボタンを押し、払い出しをするときには、PAYOUTボタンを押し。コントローラは、そのプレイヤーの選択をまつ。

ここで、後述する準備ルーチンS113を平行して実行する。

【0031】

図29、図30は、ダブルアップゲームの説明図である。

ダブルアップを選択した場合には（図31のS115）、モニタ画面の左端部からカード21pが1枚配られ、図29の画面になる。このとき、カードはオープンされていない。このダブルアップゲームは、配布されたカード21pが「13」よりもSMALL（「1」～「12」）なのか、BIG（「14」～「25」）かを当てるゲームである。

SMALLを選択する場合には、セレクトボタン24Aを押し、BIGを選択する場合には、セレクトボタン24Dを押し。コメント欄21hは、カード21pが配布されるまでは、「GOOD LUCK」を表示する。

【0032】

セレクトボタン24A又は24Dが押されると、カード21pはオープンし、ダブルアップゲームの勝敗が判定される。図30の場合には、カード21pは「10」であり、SMALLであるので、「WIN」となった状態である。

勝った場合には（図31のS117）、再度、ダブルアップゲームを行うか、払い出しを行うかを選択する（図31のS117）。再度、ダブルアップゲームを選択すると、画面上のカード21pは、左端部へ流れて消え、それと同時に右端部から新たなカード21pが出現し、プレイヤーの動作を待つ。

【0033】

再度、ダブルアップをせず、PAYOUTを選択しないと、コメントは、「CONGRATULATION」の表示となり、PAYメータに、WIN枚数が表

示され、その枚数を減算し、CREDITに加算される(図31のS119)。PAYOUTを選択すると、コインが払い出される(図31のS118)。その動作が終了した時点で、コメントは「GAME OVER」の表示がなされ、次のゲームに移行する。

【0034】

次に、図22によって、準備ルーチンに付いて説明する。

5個のボールBがポケットインで、入賞の判定をしているときに、ボールを回収し(S1131)、次のゲームの準備をする。ついで、プレーフィールド板11の傾斜が反転されるとともに(S1132)、各ポケットのナンバーがランダムに決定される(S1133)。さらに、スペシャルナンバーも変更され(1132)、リターンする。

【0035】

【考案の効果】

以上詳しく説明したように、本考案によれば、プレーフィールド部材の傾斜を所定のゲーム回数毎に反転させるので、経時的変化により盤面の癖のようなものが発生しにくく、ゲーム性を低下させることはなくなった。

また、交互に傾斜するので、プレーフィールド部材のいずれの側にいるプレーヤーに対しても、平等に見え不公平感がなくなった。

さらに、プレーフィールド部材の傾斜を必要に応じて変化させることができるので、ゲームに変化を持たせることができる。

【0036】

さらに、ポケットに対応する数字を変更することができるので、特定のポケットに入りやすくなっても、数字の並び方が偏ることもない。